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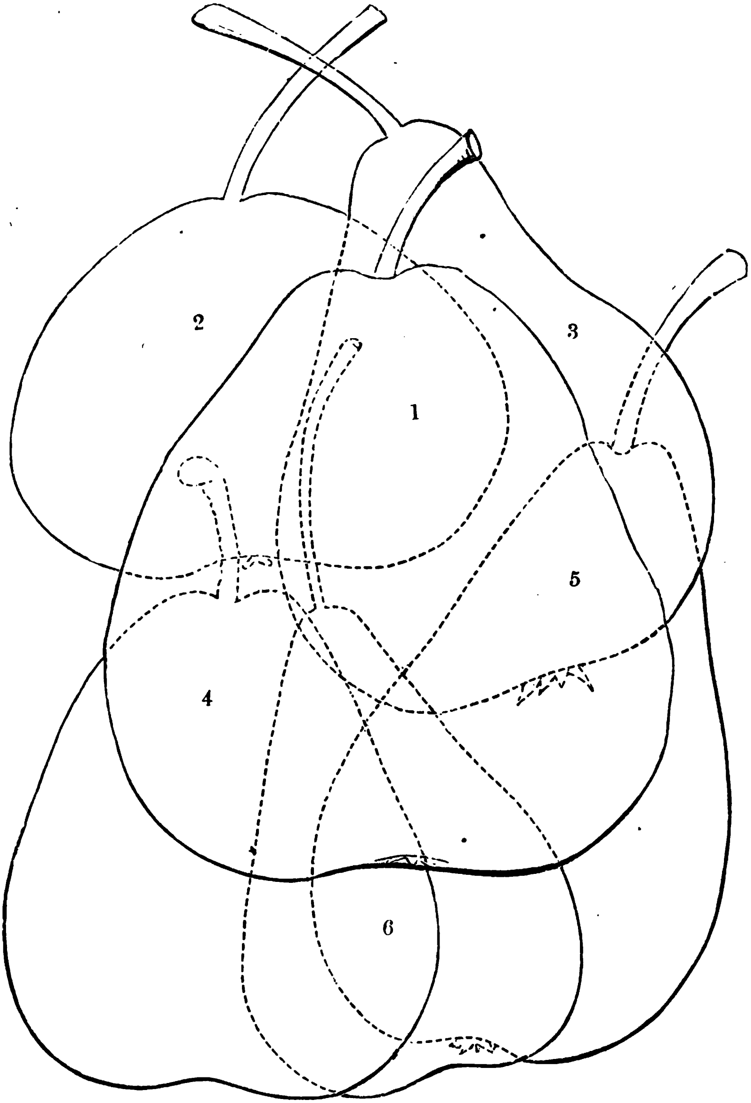

GROUP OF FINE SUMMER, AUTUMN AND WINTER PEARS.

Selected and drawn by Mr. L. Berckmans.

No. 1, Niles.	No. 2, Fulton.
No. 3, Beurre d'Amalis.	No. 4, Doyenne d'Alencon
No. 5, St. Nicholas; or Duchesse d'Orleans.	No. 6, Rostiezer.

Hyde

PEAR CULTURE.

Recd Dec 9/84

Pd —— M. ——

A MANUAL

FOR THE

PROPAGATION, PLANTING, CULTIVATION,
AND MANAGEMENT

OF

THE PEAR TREE.

WITH

DESCRIPTIONS AND ILLUSTRATIONS OF THE MOST PRODUCTIVE
OF THE FINER VARIETIES, AND SELECTIONS OF KINDS
MOST PROFITABLY GROWN FOR MARKET.

BY

THOmaS. W.arr FIELD.

The golden-dropping Pear, the reddening glow
Upon the cheek of Beauty, and the Peach,
Have common source and end. The Dust
We till, we are. The nodding flower, the Elm,
Arching in cloisters and in vaulted aisles,
Are man, or beast, or worm, in other forms.

No marble dumb, or crumbling tomb shall rear
Their pale chill walls o'er me. The tree I plant
Shall monument my dust—itself the tree,
Refined in leaf, and fruit, and flower: that when
The immaterial part puts matter on
Again, it is more fit for Heaven.

New York:
A. O MOORE, AGRICULTURAL BOOK PUBLISHER,
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1858.

Entered, according to Act of Congress, in the year 1858,
By A. O. MOORE,
In the Clerk's Office of the District Court for the Southern District of New York.

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Reclass 6-5-40 MJR

This Book is Dedicated

TO MY FRIEND,

DR. LOUIS E. BERCKMANS,

AS A

MARK OF AFFECTION AND RESPECT.

THE AUTHOR.

PREFACE.

THE pleasure with which I have, for several years, pursued the labor of collecting and arranging the matter of this Book, melts away, as I approach the tribunal which is to pronounce upon the result of that labor. The Public which an author fears most is, after all, very small—it is those of his own craft, who will easily discover his failure; and it is precisely that small Public whose favor I am most anxious to deserve. Cardinal DE RETZ once said: "He who is in good repute among his own order, can not easily be overthrown."

It is from intelligent Pomologists that I shall receive censure with the most humility, and praise with the most gratification; and it was in hope of earning the latter that I have begun and completed this work.

There is so little that is really original in any work, that the unguarded and jealous critic, in reviewing some humble author, is in imminent danger of launching his bolt at some great and standard authority. When charged, by a critic of such rank, with imperfections, I shall only be able to answer: "Sir, the best Pomologists have contributed the most perfect results of their investigations to this work; and the insensible plagiarism, by which another's idea is reproduced in my brain, ought not to create prejudice against the idea." So much of what is excellent in this work may, by long residence in my own brain, seem to have had its origin there, that it would be vain to attempt, at this late hour, a restitution of ideas to the proper owners. When known or recollected, the authority whose matter has been quoted is noticed in the body of the work.

It requires to be distinctly stated, that the plan of this book does not admit of that extensive description of varieties which would be desired by an amateur of long experience in the cultivation of the Pear. Its design is to answer, in a clear and intelligible manner, the oft-repeated questions of the novice: "What kinds of Pear Trees can I plant most profitably?—and how shall I treat them, to insure a return of the investment?"

The Author has indulged no higher ambition than to answer these queries satisfactorily—and does not claim the ability to instruct those experienced Pomologists, whose lives have been spent in patient investigation of the most minute phenomena attending the Propagation, the Development, and the Fruiting of the Pear Tree.

In constant communication with Horticulturists, the want of a Manual of Pear Culture, so often suggested by them, originated in my mind the idea of collating the experience of the best cultivators; and stimulated by my own hearty love of the subject, I have executed the work now offered to the lovers of that noble fruit.

If it shall result in a more intelligent treatment of the beautiful but dumb companions of the Horticulturist, and thus obviate much of that disappointment which has flowed from ignorance of the peculiar requirements of the Pear Tree, and of the varieties to be selected, the Book will have performed the office for which it was written; and the Author will not regret his work.

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PEAR CULTURE.

INTRODUCTION.

While revolution and conquest were disturbing the equilibrium of the political world, during the last twenty years, bringing dread and terror in their sanguinary train, another revolution was progressing, more enduring—as it was productive of happiness, instead of misery.

This was, the revolution in the culture and production of everything which the generous earth yields to man's cultivation; but more particularly manifested in the propagation and perfection of fruits.

Our fathers required the whole of their long lives to eat of the fruit of the tree they planted. But by the new arboriculture, the youth may pluck fruit from the tree he planted when a child.

In none of the fruits is this peaceful revolution so striking as in the culture of the Pear. From the long period of twenty or thirty years required for the fruiting of the tree, we have deducted more than four-fifths, and reduced the time to three or four.

The introduction of the French method of propagation upon the Quince stock has given such an impetus to the cultivation of the Pear, that the sales from a single nursery in this country reach the enormous number of half a million trees in one year. It is undoubtedly true that the propagation of the Pear on the Quince, by its early production of this noble and beautiful fruit, will be the source of more unalloyed pleasure, and more innocent and healthful gratification, than any discovery in the arts and sciences for the last twenty years.

The origin of this method of propagating the Pear must not be looked for in very recent times—as trees more than a hundred years old, originally upon the quince stock, may be found growing in France. The history of its introduction into this country would not be difficult to trace; but I have been able only to ascertain sufficient to induce me to believe, that Mr. PERKINS, of Boston, was among the first to introduce it, nearly forty years since; soon after, MARSHALL P. WILDER, of Boston, and Mr. MANNING, of Salem; and later still, Mr. HOVEY, of Cambridge, commenced the cultivation of quince-rooted pear trees, which may be seen in those places more than thirty years of age.

Mr. MANTEL, of Astoria, was for some years in opposition to Mr. A. J. DOWNING, the earliest advocate of its general cultivation; but it was not until within the last eight or ten years that the planting of the trees had become very common. Indeed, it is only within a year or two that the theory was broached, which governs the whole constitution of the compound tree, viz.: that the office of the Quince is entirely as root, and not as a trunk.

That we shall arrive at a point of excellence in the propagation of the Pear which will enable us to dispense even with the Quince in great part, is not doubted by good pomologists.

In the original introduction of the Pear as a fruit into this country, the French Huguenots bore a prominent part. In preparing for their exile, they doubtless selected the seeds of their best varieties, and planted them around their homes in the New World. This is evidenced by the multitude of aged trees (many of them producing fine varieties) in the immediate neighborhood of their first settlements, particularly on Long Island and at New Rochelle, in Michigan and Illinois.

It is not a little curious to observe how the taste and preference for this fruit has survived in the countries through which the Huguenots passed in their flight, or where they temporarily sojourned. Belgium and Holland have produced more fine varieties, and more eminent cultivators, of this fruit than all the rest of the world.

There are many questions relating to the Pear, which are still little understood, although discussed for a long time by men of talent. Among these are: the decline of certain highly-esteemed varieties, which can no longer be grown in localities where they formerly ranked as the highest and best; the excellence of many varieties in particular places, and their inferiority when grown in others; the refusal of some varieties to grow upon the Quince stock.

These, and many other mysteries, which have caused as much disappointment and chagrin to the cultivator, from his inability to account for them, as from his failure to obtain the fruit, cannot, from the limited character of this work, be discussed at length. The Pear has proved, by experience, to be adapted to as wide a range of territory in the United States as the Apple; and on the lighter soils of the Atlantic coast, to be much more productive. We are beginning to learn, too, what varieties are adapted to special localities and soils; and amid the great multitude of excellent kinds, it will not be difficult to find some that will succeed, with ease, in the most unfavorable location.

We are not confined now, as formerly, to a single variety, that ripened in August or September, whose evanescent excellence vanished in a day or two; but by a skillful selection of varieties, we extend the enjoyment of this king of fruits over a period of eight or nine months—or from August to May.

A great advance has also been made in the quality of the fruit; for in place of the dry and mealy Sugar-Pear, the insipid Jargonelle, and the griping Winter-Bell, we have obtained the Flemish Beauty, the Duchesse, and the Easter Beurré.

That we shall continue to make great progress in the knowledge of varieties, their propagation and improvement, can hardly be doubted, as long as such intelligent and enthusiastic men as DOWNING, WILDER, BERCKMANS, HOVEY, BARRY, THOMAS, and BRINCKLE, continue to cultivate the Pear. To them the pomologists of this country owe a large debt of gratitude; and to them I am indebted for much that is valuable in this treatise.

PART I.—PREPARATION OF THE SOIL.

To the tree-planter, the author would say, in the commencement of this treatise, as its most important and best fortified proposition: that the most complete and thorough preparation of the soil is by far the most economical and productive.

Let none, therefore, be deterred from its performance by the labor of preparation, as its neglect will perpetually remain a source of regret. Defects or neglect in this matter can never be entirely remedied by any future nursing or manuring. The thorough pulverization, deepening, and mixing of the soil before planting, will insure a healthy and vigorous growth, which the best subsequent system of manuring, trimming, and cultivation, can never equal.

The satisfaction and delight that one feels in growing a beautiful tree, are enhanced by the knowledge of having been the instrument in supplying a soil and cultivation intelligently adapted to its perfection.

The nurseryman is called upon to answer no question oftener than the vexatious query: "How large holes shall I dig for planting my trees?" It can only be answered wisely by saying: "If you have one hundred trees to plant, dig but one hole for them all—

in other words, dig the whole field as thoroughly as you would the space for a single tree. If tree-planters would observe this rule, few of them would suffer the disappointments which often attend transplanting. So few persons, however, can find courage to invest this amount of labor in the mere planting of a tree, that it is a little to be feared that some will be disinclined to attempt anything, when so much is demanded for perfection. To such it can only be said: "Undertake less than you intended, but perform that little in the best manner."

The processes for the important work of thorough preparation of the soil are: first, Draining; second, Plowing and Cropping the Ground; third, Trenching—fourth, Manuring.

DRAINING.

Thorough drainage has become so much a matter of faith with intelligent agriculturists, that it is considered almost heresy to doubt its value or necessity in all soils.

Without questioning the truth of this extreme doctrine, it is sufficient for us to say: that all soils, possessing any of the following conditions, must, to secure a healthy growth of the pear tree, be first thoroughly drained.

1. Those composed principally of clay.

2. Those which rest on an impervious subsoil.

3. Those generally upon which water remains more than an hour after rains.

4. Those in which springs, or springy ground appears.

5. Those which lie at the base of a hill at some distance below the summit.

6. Those which lie so nearly level that, although porous in their character, do not allow the water to flow off readily from the surface.

On any of the varieties of soil mentioned, without draining, the pear tree is peculiarly subject to serious diseases. The winter or sap blight finds its most numerous victims upon them, while in the worst conditions of such soils the growth of the tree is slow and stunted. In soils at all retentive of water, thorough drainage is the only safeguard against these evils, and many positions, not suspected of this defect, will be found upon examination to be sadly in need of this remedy.

If the plot of ground lies at the base of a hill, or on its slope, at some distance below the summit, the water percolating through the soil from the higher ground will find its way to the surface along some saturated strata; and the least that can be done will be, to cut a ditch of from four to five feet in depth along the upper line of the ground, thus intercepting a part of the descending waters.

This ditch should be laid with tile, or a rude but effective channel made of rubble stone, and in both cases should be half filled with the latter, when procurable; upon which a thick layer of straw should be placed, and the earth pressed firmly in to fill up the ditch.

For more minute directions relating to the conditions of soil requiring drainage, and the various methods of effecting it, the reader is referred to the works upon that subject. It is sufficient for this place to say, that there are but few soils that would not derive great advantage from thorough under-draining.

PLOWING AND CROPPING THE GROUND.

When the planting of an orchard can be anticipated for a year or two, the ground should be prepared by growing some hoed crop upon it; as the proper treatment for a good crop of corn, or potatoes, forms an excellent preparation for the growth of trees. By this plan, the soil is reduced to a fine tilth, the weeds are subdued, and if the crop has been well manured, the ground is rich enough for the first year. If the soil is clayey, or otherwise retentive of moisture, the plowing should be performed in the fall, and left in ridges; but if at all sandy and light, it should be left as compact as possible at that time, and not plowed until spring.

The ground should be double plowed, by turning a deep furrow, and following in the bottom of that furrow either with a subsoil or common plow. If there is such a thing possible as stirring the soil for eighteen or twenty inches in depth, it should by all means be accomplished, for this reason: a hole dug in a soil, more or less compact, is in effect a cistern. This, while it loses capacity, does not lose any of its power to retain water, by being filled with loose soil, in which a tree is planted. The invigorating effect of water upon the roots of plants is probably nearly exhausted in the first few moments of its contact with them, and becomes less and less valuable, the longer the same particles remain, until it is a cause of absolute injury.

If the hole, therefore, is dug deeper than the surrounding soil is loosened, the lower part of it will retain water for an unhealthy action upon the roots planted in it. But if the earth is loosened over the whole field, as low as the bottom of the deepest hole, the drainage from that hole is perfected, and the otherwise stagnant water will flow off, provided an outfall from the field is secured.

An excellent plan for those who are pressed for time is, to plow five or six furrows, twice deepened, or subsoiled, in the line where the planting of a row of trees is intended, and omit the intervening spaces until a later period. Let these furrows be run, if possible, in the direction of the slope of the ground, to act as drains.

Those horticulturists, however, who intend performing their work in the most thorough manner, should take this rule as their standard.

Pulverize the soil of the whole field to a depth greater than the longest roots will be planted, and this can only be well done by

TRENCHING.

As frequently performed, the best results of trenching are not attained. The true design of its performance is, to add to the depth of the soil, without destroying its capability.

When the fertile earth near the surface is thrown to the bottom of the trench, and covered ten to twelve inches deep with sterile soil, which has never been aerated by frequent stirring, in contact with the atmosphere; either a very large quantity of manure must be applied, or, with ordinary treatment, some years must elapse, before the soil can become fertile, or capable of sustaining trees in a healthy condition.

A trench, two or three feet wide, should be dug to the proposed depth, across the end of the ground designed for trenching, and the earth deposited on the side of the ditch opposite to the space intended for treatment. The soil thrown up should now be dressed into an easy slope, so that other earth cast upon any part of its face will not fall to the bottom of the trench, but remain where it is placed.

A single spade's-width should now be taken from the surface soil, and scattered evenly over the sloping breast of loose earth, forming a layer of three or four inches in thickness, from the bottom of the trench to the top of the bank. Over this should be thrown the next spade's-depth of subsoil, forming a somewhat thicker layer; and this again is to be covered with part of the adjoining surface-earth; and lastly, over this is placed the third spade's-depth of subsoil. The bottom of the trench may now be simply loosened by the spade, without throwing up the earth, unless it is determined to trench deeper than two feet. The manure to be used should now be spread evenly, so as to form another layer from the top to the bottom of the sloping bank, and the alternate strata of fertile earth, barren subsoils, and manure, continued to the end.

The object to be attained is, so thoroughly to mix, as well as pulverize, the two soils thrown together, as to dilute the good earth with the inert; but it will be perceived, that they have only interchanged positions, without commingling.

The layers of soil and manure declining at an angle of about forty-five degrees, and which now exhibit their edges at the surface, may be thoroughly intermingled by one or two deep plowings. It will at once be seen, that a soil deepened in this manner will demand much more manure than when cultivated to the ordinary depth.

When the trenching of a plot of ground is finished, a ditch will remain, which must be filled with the earth first thrown out at the other extremity of the field.

The cost of trenching an acre of ground will depend greatly upon the character of the soil, and the depth it is worked.

The trenching of my own ground may not afford a fair criterion, but it will furnish a basis by which calculations may approximately be made of the expense.

The soil was a sandy loam, deepened to an average of nearly three feet, with the surface earth of the adjacent streets, and though very free in its composition, had been very much hardened by the passage of the carts in filling.

LABOR ON ONE ACRE—TRENCHED THIRTY INCHES DEEP.

Plowing, one day	$3 00
Seventy-two days' labor, at $1	72 00
One day carting soil from the first trench to the last one, 2 men	3 00
Removing stones thrown out	1 00
	$79 00

From some comparison of the amount of labor upon other grounds, I am convinced that the above would prove nearly an average cost, although the trenching of heavier and more stony lands would cost as much as $100 per acre. Where the labor of preparing an acre at once, appeared too formidable a task, a number of amateurs have practiced the following plan at my recommendation with good results.

The ground intended for planting is divided into four equal parts ; and if the whole plot contains an acre, and is a square, each fourth will contain almost 11,000 superficial feet, and its four sides be each 105 feet in length. A more convenient plot, for spacing the trees accurately, would be, 100 by 110 feet. Extending these lines to 220 feet by 200 feet would inclose but a trifle more than an acre.

One of these quarter-acre plots should be thoroughly trenched and manured, to receive all the pear trees intended for the entire acre. None of these trees need be removed before the end of the second year, when another plot has been prepared for the reception of every alternate tree in each alternate row. At the end of the third year, another square having been trenched, remove every alternate tree from the rows, which at the last removal were untouched. The original square will now contain one half of the whole number of trees, or double its quota ; and the removal of every alternate complete row to the fourth unoccupied square, in the fourth year, will place the trees at equal distances throughout the entire ground. Somewhat more than the exact number of trees necessary to complete the plan should be planted in the first year, in order to be able to compensate for the loss of any, by substituting trees of equal size and vigor.

This plan presents advantages which will be more largely discussed, but of which the following is a synopsis.

1. It divides the labor into practicable portions which do not discourage the planter by their magnitude, and the work is better performed than if more were demanded at once.

2. Manure, which would be difficult to obtain in sufficiently large quantities, for preparing the whole ground well, may be easily procured for one-fourth the area.

3. In the best selected lot of trees, there will, from various causes, be some that fail in the first two or three years, and if planted in an orchard, would leave an unsightly blank—or require the planting of a tree that will always break the harmony of the ground, by its smaller size. But trees taken from the near supply will scarcely lose any vigor, by a careful second transplanting, and not one in a thousand should be lost.

4. The root-pruning occasioned by removal hastens the bearing of pear-trees, on both pear and quince stocks, many years.

5. All the nursing which young trees especially require is brought within a small compass, and the labor is materially lessened. The mulching, the hunt for insects, and the washing of the trees, are all performed in a small area, and without the fatiguing labor of travelling long distances. The pear tree, above all others, is especially fitted for frequent removals, and

is, indeed, benefited by them in acquiring capacity for early fruiting

MANURING.

Undoubtedly, the most thorough preparation for an orchard or fruit ground would require the enriching of the whole soil nearly as well as most cultivators do the space immediately around the tree. As it is intended that the entire body of earth within the limits of the fruit ground shall be occupied by the roots, it is important that it should contain sufficient nourishment for their sustenance. During the first few years, it is true, they would be supplied with the pabulum they find immediately around the tree, and that in a light soil much of the nutriment at first supplied would have escaped before the trees were fitted by age and growth for its appropriation. But for such a soil, the manure should be adopted to its peculiar condition, and be composted with a large bulk of clay, or swamp-muck, or other organic matter, which will enable a hungry soil to long retain the fertilizing agencies applied to it. A soil, however, which has been naturally supplied with but a moderate proportion of vegetable mould or clayey loam, will not forget for many years the influence of a manure which has been deeply deposited. Used in this manner, manure will exhibit its influence upon the growth and fruiting of the pear tree in a much greater degree than in any subsequent application. It not unfrequently occurs, that sufficient manure for the whole space of ground to be fertilized is not readily obtainable at the time of planting.

To economize the quantity for present use as much as possible, a partial application, that will serve temporarily, may be made along a line of five or six furrows in width, thoroughly plowed in, and intermingled with the soil. After the holes are dug along this line, well-rotted manure should be strewn in them, and covered with soil. Occasionally, as the hole is being filled over the roots, more manure should be well pulverized and shaken in, but in all cases, in such a manner as to prevent its direct contact with the roots. In deepening a soil for any purpose, it must be remembered, that as the quantity of earth to be enriched is greatly increased, a much larger amount of manure will be required. If it be desired to increase the depth of a soil of nine inches to eighteen, and the manure is thoroughly intermixed to that depth, it will require more than double the quantity of the latter, which would be needed to fertilize the first nine inches of depth, as the subsoil is nearly devoid of nutritious matter. But, as the escape and loss of this is upward into the atmosphere, the deepened soil will retain the volatile constituents of manure much longer than a shallow one.

MANURE FOR PEAR-TREES.

It is a general truth, that the manure that will produce a good crop of corn or potatoes will perfect a crop of fruit; but while special manures are to be jealously criticised and tested by experiment, still something should be learned from the special demands of the plant. In the ashes of the pear and apple wood or fruit, and in the potato stalk and tuber, a very large amount of potash is found, and the theoretical deduction from that fact, that potash or ashes would add largely to the growth and fruiting of these varieties of trees and plants, is found true in practice. But in the ashes of wheat, comparatively little potash is discoverable, while in its place is seen a large amount of phosphates; and, accordingly, we find the various salts, of which phosphoric acid is the base, exercise a great influence in increasing the wheat crop. Now it would be blindness or mulish obstinacy to neglect these facts, and apply manures without attention to the special wants of a plant or tree. Farmers and gardeners who scout contemptuously the teachings of science in regard to manuring, daily practice the most scientific and special theories for manuring plants, to produce perfect vegetables and flowers.

Well-rotted stable-manure is without doubt the safest, and ordinarily the most convenient, form in which nutriment can be conveyed to trees, but it is not always attainable in sufficient quantities, nor does it alone produce the highest result. Guano is a convenient manure, though temporary in its action, unless combined with twenty times its bulk of charcoal-dust, plaster, or partially, dried muck. From two ounces to half a pound may be applied to each tree at planting; varying in quantity according to the area and depth of ground in which it is distributed. But in no case should it be placed so that the roots will have less than three to six inches of earth, protecting them from its caustic influence. Guano affords an admirable liquid-dressing for trees (especially when exhibiting a languid growth) applied at the rate of an ounce or two in a pailful of water, distributed for a space of three or four feet around the tree.

Of the more concentrated forms of manure, ground bones, horn shavings, etc., are decidedly the best, especially when dissolved in sulphuric acid.

When used without this treatment, the bones should be a mixture of the finely-ground bone-meal and the crushed half-inch bones in equal quantities. The first will decay rapidly, and afford immediate nutriment to the roots, while the latter will last longer, and yield their virtues when the finer bones will be completely exhausted. But even these generous and excellent manures have a better effect mixed with coarser manures, such as stable-litter, horse-dung, swamp-muck, and other decomposing organic matter.

Summer applications of stimulating manures have a tendency to produce late succulent growth that does not ripen, and which the winter blights or kills down, endangering the life of the whole tree with its poisoned sap. Late spring applications of manures also stimulate wood-growth to such an extent in midsummer, as to induce the tree to throw off the young and half-grown fruit.

In the grounds of the author, during the last season, a Bartlett Pear tree, three years from the bud, set 520 pears. When the fruit had acquired the size of musket-balls, the tree was supplied with guano and superphosphate of lime, dissolved in large quantities of water, in order to ascertain how great a number of fruits a tree six feet high, and one and a half inches in diameter of body at the ground, would ripen. A barrel was filled with the solution, and set so as to leak slowly about two quarts daily around the roots.

As the summer advanced, fine thrifty shoots, two and three feet in length, covered the tree, but all the fruits, except about thirty, fell before ripening: while on trees not stimulated by such unnatural nutrition, and which made little or no wood-growth, more than fifty fine pears were matured.

No tree of that size should have borne one-quarter of that number, but it was an experiment in which the good of individual trees was not regarded. Nature usually refuses to perform the double labor of wood-growth and large fruit production during the same period; and we cannot, with all our skill, induce her to disregard the laws which govern her delicate and wondrous processes.

When rich stimulants are applied to bearing trees during the growth of the fruit, the latter is almost certain to fall prematurely, as soon as the unusual nutrition is exhibited in more thrifty production of wood-growth.

The proper time for the application of such highly organized manures as have been mentioned, is in the fall or in early spring, during the hibernation of the tree. They should always be well and deeply worked into the soil. The cost of manuring varies much with the locality and price of stable manures. If thoroughly manured for the reception of 400 to 800 pear trees—an acre should receive from twenty to fifty double wagon-loads of stable or compost manures. Thirty-five wagon-loads, at two dollars each, would fix the cost of manuring an acre at $70, which would be a very moderate sum.

In the grounds of Prof. Mapes, at Newark, New

Jersey, may be seen pear trees of luxuriant growth, producing great quantities of the finest fruit, which have been manured, as he assured me, only with superphosphate of lime.

COMPOST.

There is nothing in his range of labors that gives the genuine lover of fruit and vegetable growth such complete satisfaction as the increase in size and excellence of his compost-heap. In it the cultivator is storing up his chemicals for Nature's laboratory, and is thus prepared to furnish to her the elements which shall come forth the purest gold. Untold wealth lies hidden in its dark and unseemly mass, and at the magic touch of the great enchanter, shall burst forth in forms of wondrous beauty. In it his imagination sees hidden the subtle essences which will ripen the golden pear, color the cheek of the melting peach, give lustre to the green foliage and beautiful growth of the trees on which his care is bestowed; and thus he cheats his senses of the loathsomeness which appears to others.

No single substance or kind of manure contains all the virtues or manurial requisites for tree or fruit growth; and a compost which contains all or most of the fertilizing agents, will be always found in practice to produce the finest growth and fruit.

Excellent results in the growth and fruiting of pear trees have been obtained from a compost formed in the following manner: Peat or swamp muck, and the tough sods of an old headland, were laid down in a layer about six inches thick, and twenty-five feet square, and on this a layer of old leather shavings, three to four inches, and an inch of refuse lime were placed. These layers were repeated until the heap was five or six feet in height. . To every second layer of sods or peat was added one inch of bone-meal, amounting to one hundred bushels in the aggregate, and twice on the top of the sods a layer of six inches of horse manure, that aided in starting the fermentation. The whole was encased and topped off with sods. A narrow rim was turned upon the edge, forming a basin, and five hundred pounds of potash, dissolved in water, poured upon the heap. If ashes had been obtainable, one hundred bushels of unleached, or three hundred to five hundred of leached ashes would have been applied. The heap contained one hundred cubic yards, was turned twice before spreading on the soil, and was intended more as a medium of distributing the potash, lime, and five hundred pounds each of guano, and superphosphate of lime, afterwards added, and for forming with the peat and leather shavings a good retainer of ammonia in the soil.

Let every fruit-raiser, each spring and fall, prepare such a compost as the following, and the results of its application to trees will astonish and delight him.

A heap of leaves, leaf or swamp muck, peat, or rubbish of any organic matter, should be placed at a convenient distance from the house (for no offensive smell need be apprehended, if properly treated), to receive the wood-ashes, the soapsuds, the kitchen and chamber slops.

Another heap should be formed at the stables, or rather, a pit should be dug, and half filled with the absorbing materials, in which should be thrown all the bones and spoiled meat, the carcases of fowls and animals, all the old fish and meat brine, the night-soil from the privies, and the liquid manure from the stables. Even the coal-ashes should be preserved for the small per-cent of alkaline salts they contain; and to the whole, iron should be added in some shape, either as cinders from the blacksmith's shop or the foundry.

All this mass is effectually deprived of offensive smell, by covering with a fresh supply of muck, whenever an escape of nitrogenous matters is perceived. The effect of such a compost, applied to fruit-trees, is almost startling, in the rapidity and hardiness of growth it induces, and in the luscious and highly-colored fruit a soil so fertilized will bring forth.

As the dark and loathsome mass swells in its proportions, the cultivator (who knows it is but the ungraceful form which covers a beautiful soul) sees gorgeous flowers and fruits emerging with colors no mortal hand could bestow.

DIGGING HOLES.

If the soil has been trenched or deeply plowed, the digging of holes for trees is a work of comparatively small labor, and they need be made but little larger than sufficient to accommodate the roots without bending or crowding. When, however, the soil has not been thus deeply prepared, the holes should be dug as deep and as large as the most generous views of the planter would dictate, taking care, only, that they shall not be a less width than twice the diameter of the spread roots to be planted in them, nor of a less depth than six inches below the bottom of these roots.

When it is intended to prepare the ground only in the immediate vicinity of the tree, the holes should not be less than four feet in width, by two feet in depth. But no plan can be more defective than digging deep holes in retentive clayey soils, where water will collect without freedom of passage. Filling this hole with loose earth does not alter its character for retaining water, and the roots must soon decay. When it is only intended to dig such holes without connecting them one with another in the form of a trench, having an outlet fall, the planter had far better dig but a shallow hole, and prepare himself for very indifferent results without more pains than mere hole-digging.

DIGGING TREES.

The disappointment and chagrin which the tree-planter feels at seeing a sickly tree linger feebly through three or four seasons of yellow leaves and dwindling branches, would often be averted if some person interested in the life and growth of the tree, and with skill to direct, were present at its digging.

It is just at this point that the care of the cultivator should begin, for it is too late for skillful management, when the tree has been ruined in the digging.

No disappointment can be more exasperating than that experienced by one who waits with feverish impatience, year after year, for the fruiting of his trees, and sees them struggle, almost like living sentient things, to preserve a sickly existence, and ultimately die from the violence and abuse they received in displacing them from the nursery. Many a person has retired care-worn from business, to the farm he has labored half a life-time to obtain the means of purchasing, only to be driven back into the old mill-track again, by disappointment at the result of his labor in planting the imperfect, rootless trees sent to him from some famous nursery. The nurseryman is usually sincerely desirous that his trees should be taken up carefully, and arrive in good condition; but petty questions arise regarding the expense of increased labor in digging or packing carefully, and his reflection usually is: that he "guesses they will do pretty well.". In pressing seasons, too, he is glad to engage the most ignorant foreigner who offers; to be employed in digging up a tree, about whose necessities the laborer knows no more than he does of the constitution of the country of which he is, or expects to be, a voter. Pat or Heinrich, with no higher idea than that he is to take out a good spadeful, sets in his spade close to the body of the tree, and by lifting, and prying, and twisting, brings out a living thing from the earth, which although mangled, and torn, and cut, he cannot conceive is hurt, because it does not groan.

It is not only stupidity and ignorance with which the purchaser is obliged to contend, but an utter indifference on the part of the laborer to the success or failure of the tree; and his desire to exhibit a good day's work induces him to hasten that part of his labor in which he should exercise most care.

In all cases, one should begin with the intention of hastening no part of the digging of a tree which can be better done with more time. If the tree is more than two years old, commence at a distance not less than two feet from the body, and increase the distance one foot for every inch in thickness of the tree at the earth-collar. Set the spade into the ground with one edge of the upright blade always turned towards the tree, and bending back the spade, raise the earth with a shaking motion, that will free it from the roots raised by the blade. If the flat side of the blade and the face of the digger were turned towards the tree, every root would be cut off clean, where the spade enters the ground. But by the first method, in addition to the two feet of roots in the solid ball, there will remain rootlets and fibres to the width of the spade.

In this manner proceed around the tree, with the edge of the spade turned towards it, and you will cut very few of the roots which extend into the trench.

Let a sharp cutting spade be provided, which should never be used for digging, and with this cut smoothly all the roots that extend beyond the trench until the lowest layer of roots is reached, and proceed to dig under them, by laying the spade nearly flat, and parallel with the ground, and thrusting it under the ball to cut the tap-root. Having cleared away the loose dirt, shake the tree gently back and forth, until it is ascertained where the tree is held by the remaining roots; and then, with a digging-fork, dislodge the earth in the ball from them, and only lift it when you find that the tree will not strain, or the roots break.

A gentle shake will now free it thoroughly from earth without dashing it against the ground, as most laborers will do unless watched. From this time, the sooner it is in the ground the better; but if replanting is delayed, Nature must be imitated as nearly as possible, by hiding the roots from the light and air, in the best manner, and as soon as you can. An old rug, pieces of matting, wet straw, or, when these are not convenient, a light, but complete covering of pulverized soil, should be thrown over the roots.

Even in a rainy or cloudy day, injury is received by exposure to the chilling atmosphere or light.

When the soil is sufficiently adhesive, and the trees to be planted are near their destination, a ball of earth may be left around the roots, and the whole carefully lifted in the arms of two men, and set in the hole.

There is in plants a condition somewhat analogous to animal heat, though hardly sufficiently well defined to be pronounced vegetable heat. But it is certain that the temperature of plants must be maintained within a limited range, to preserve their juices from destructive change; and this limit is much restricted, when the roots are deprived of their natural protection, and exposed to chilling atmosphere. It is not necessary that the temperature of the air should even be lowered to the freezing-point, to accomplish great injury to the naked roots, which, while protected by earth, could endure an absence of heat indicated by thirty degrees below zero. There is something in this analogy of condition of plants to living beings which, while it excites our wonder, reveals to us how little we have yet learned regarding their mysterious processes.

I have seen some of the roots of a pear tree, standing upon a bank, exposed on one side entirely unprotected, to a severe winter, without injury. The requisite condition, or heat being maintained by their connection with the larger body of roots, which were protected in the soil—just as we daily expose a part of the person to the cold with impunity, while the naked body would not endure a temperature many degrees higher, without perishing.

There is an equal danger in exposure to the opposite extreme of temperature, though not so rapid in its consequences. A cold bleak wind is far more effective in drying up the sap than a moderately warm temperature, exerted for the same length of time. The effects of both extremes of heat and cold are the same. The sap is inspissated to such a degree, that the empty cells close up, and become incapable of again exerting the mysterious endosmose action by which their functions are employed. Could the lungs of a drowned person be once more inflated, the blood would commence its flow; or could the blood be induced to move by friction, the empty air-cells of the lungs would fill, and the vital functions of life once more commence. Could we fill the collapsed sap-vessels of the dried tree, we should gain one point in its recovery, and in the appropriate place the means for this will be discussed.

SOILS FOR PEARS.

It is somewhat mortifying to the promologist, after twenty years of careful study of the laws which govern the growth and fruiting of trees, to feel constrained to acknowledge, that not only what he has learned from others, but much of what he has gathered from his own experience, is to be distrusted—perhaps unlearned.

In nothing is he likely to be more disappointed than in the soils which analogy and theory would induce him to point out as superior. So many influences and conditions affect the results of horticultural effort, that disappointment often follows the selection of what appear the finest soils. The Newtown Pippin, on the soil of Long Island, where it originated, refuses to yield the exquisite juices and rare perfumes which distinguish this king of apples; and from the same island which once sent forth sloop-loads of the rarest Vergalieu Pears, scarcely a bushel of perfect fruit of that variety has been gathered in one season for the last fifteen years. Neither the richest soil, nor the most careful cultivation, any longer produce good fruit of these varieties; while on the rugged farms along the Hudson, the Newtown Pippin preserves its superiority with scarcely an attempt at cultivation bestowed upon it; and through the central and northern counties of New York, the Vergalieu continues to produce its unrivalled fruit. Most of the other varieties of Pear are produced on Long Island and in New Jersey in great excellence and abundance. Varieties of pears are pronounced excellent in the vicinity of Boston, which are worthless when raised in other localities with equal care in cultivation. These anomalies prevent us from declaring with certainty upon the fitness of any soil for all varieties of pears, when that particular locality and soil have not been tested by experiment. No prudent man will, therefore, plant a very large number of trees, of varieties which have not been proved in his neighborhood; at least, not without having made careful inquiry regarding those that have succeeded or failed.

Still, general rules that should govern in the choice of soils may be given. No soil, however rich, that allows water to remain on its surface more than a day after it has fallen, or to rise in holes dug not more than four feet deep, is fit for plantations of the Pear, or, indeed, of any other fruit tree. And no light, thin soil, which is not susceptible of deepening, can be relied on.

The soil for the Pear must be dry, and either deep, or capable from the nature of its subsoil of deepening without destroying its excellence, and of a looseness of texture sufficient to allow the free extension of the tender rootlets.

A peaty or alluvial soil, or one too rich in vegetable mould, may induce a luxuriant and beautiful growth in appearance, the succulent shoots of which a rigorous winter would certainly blight. A free loam having a large preponderance of sand, without being light, is preferable, as it is easily worked, at times when a clayey soil would be nearly a bed of mortar. With proper manuring the first would produce a stocky, well-ripened, but comparatively short growth, while the latter, if in good condition, would induce one more vigorous, but frequently unripened.

A noticeable instance of this difference is seen in the fact, that the winter blight of the Pear has never been known on the rich, but light soils of New Jersey and Long Island, which seem peculiarly adapted to the growth, productiveness, and longevity of the Pear; while the winter of 1855 destroyed many thousands of pear trees on the strong soils of the counties of Central New York. In the neighborhood of Syracuse, this was especially remarkable.

Nothing can be more fatal to the hopes of the pear grower than the selection of his trees from an alluvial flat. Blight at some period of their existence is sure to manifest itself in a great number of them. Free soils, however, it must be granted, are subject to balancing evils, in affording shelter to innumerable tribes of insect depredators, in fostering the production of equally innumerable varieties of weeds, and in more readily parting with moisture and manure.

A more nearly perfect soil as a base, for the cultivation of the Pear, is a somewhat heavy loam, composed of three-fourths of coarsely granulated sand, fifteen to twenty per cent of clay, and the remainder of vegetable matter. This should rest upon a subsoil of sand and clay, extending to the depth of three or four feet. A bed of gravel should underlie the whole, thus affording perfect under-drainage. It would be well for the planter, before engaging largely in the business, to ascertain the longevity and productiveness of such pear trees as are growing in his neighborhood. Many of the old Dutch residences of Brooklyn, erected long before the Revolution, bearing evidence of the military violence of that period, are surrounded by trees older than themselves—trees that have outlived two or three generations of houses, each of which may have seen as many generations of men pass away.

Mr. Downing certainly made a great mistake when, in writing a description of the soils suitable for the Pear, he pronounced a sandy loam unfitted for the permanent growth of the tree. Two or three hours' ride through the western end of Long Island would have convinced him that there were, in that locality, more pear trees, from fifty to one hundred years old, than in all the rest of the United States. The number of pear trees, more than forty years old, in King's and Queen's counties alone, must be greater than fifty thousand. At Greenpoint, L. I., now the Seventeenth Ward of Brooklyn, may be seen an orchard of more than one hundred pear trees, which the oldest residents remember to have been of full size, and in full bearing, in their boyhood. Three of these trees I have found to measure respectively nine feet, ten and one-half, and eleven feet in circumference. These last cannot have been in existence less than one hundred and fifty years.

These were the offspring of seed planted by the Dutch and Huguenot exiles, about the time of the settlement of the town in 1648; and are certainly good evidence of the longevity of the Pear, on comparatively light soils. I do not assert, however, that trees planted on thin, sandy soils, especially such as overlie an impervious, or a poisonous subsoil,* would not be liable to blight. On such soils, the roots, compelled to keep near the surface, are exposed to the sudden and extreme heats of summer, by which their sap is so highly heated as to destroy the more newly-formed and tender spongioles and sap-vessels. In such case, the roots are said to be scalded; because, at their shallow position, they are unable to obtain sufficient moisture for the supply of the leaves, which, by their abundant evaporation, lower the temperature of the sap—vapor being so perfect a conductor of heat. The frozen sap-blight has not, within the memory of man, been known to visit the localities above-mentioned, except under the circumstances noted relating to subsoils.

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* As is the case, to a limited extent, in some districts of New Jersey, where the protoxide of iron—so injurious to vegetation—prevails.

TRANSPORTING.

Trees ought always to be packed, when the distance from the nursery to their destination is greater than can be accomplished in three or four hours; and, even in the latter case, their roots should be well protected. Packing is a labor that most nurserymen would avoid, as the charge seldom covers the bare cost of labor and material; but no man who values health and vigor in his trees will grudge five times the usual charge, if its payment was necessary. Indeed, it ought to be a standing rule with nurserymen to charge such a price for trees as would cover the cost of packing; and then to pack them would be a matter of course, which the mistaken economy of the customer would not induce him to avoid.

Unless the purchaser has bought only a small number of trees, he should order them to be packed in boxes, that will endure the rough handling of freightmen, and protect them from bending, breaking, and exposure.

If trees are to be removed long distances in tight cases, they should be moderately dry, as if wet, or packed with very damp moss, or straw, they are liable to grow or to heat, and mould.

Straw and other coarse material should be distributed among the tops, and moss among the roots, separating not only the layers of trees, but, as far as possible, the individual trees and roots from each other. When the transit is by water for a long distance, the moss should be dried, as sufficient humidity will be gathered on the passage; and the roots should be first dipped in a mortar, composed of clay and water, by which they will receive a coating of earth, which will protect each rootlet from the atmosphere.

PART II. — THE SEEDLING, AND PROPAGATION OF VARIETIES.

THE SEEDLING.

It is surprising that so little attention has been paid to the perfection of the seeds which form the germ of the trees we so highly value. Pear seeds are peculiarly liable to prove defective, being gathered from all sources; and although they have recently sold at prices, varying from one hundred to two hundred dollars per bushel, there has not been a strict scrutiny as to their quality. The dealer cannot be too severely blamed for this, as no standard of excellence has been established by the nurserymen. The latter is intent only on procuring a large supply of stocks for budding, and as the results of inherent weakness in the stocks do not always manifest themselves in the nursery, he entertains but little anxiety about the source or defects of the seeds he plants.

After abundant experience, I am satisfied, that not one-half of the pear seeds sown vegetate; and of those that do, not more than one-fourth produce healthy stocks, and that of the hundreds of thousands of trees sold from the nurseries, not one in five reaches its tenth year.

Carelessness in transportation, ignorance, or indolence in planting, and neglect or absolute abuse in cultivation, are fatal to thousands; but the indifference of the seed collector to the condition of health in the seed, equals all other causes in destructiveness. If the fruit is unripe, the seed must necessarily be imperfect, and the perry pomace is usually formed from fruit, of which but a small portion is perfectly ripe. The variety of pear from which seed is to be taken is never considered, except by amateurs; and as many of our varieties are known to be tender in their wood, tardy in their growth, or badly shaped, and short-lived, the fruit cracking or rotting at the core, the offspring must be more or less corrupted by these defects. If allowed to remain only for a short time in the pomace or rotten fruit, acetous fermentation begins; and the seed commencing to vegetate, the germ is injured by the acid.

It must have been noticed that few seedlings make their appearance on ground where apples or pears have fallen, or been deposited after rotting in the cellar, while from the dung of animals fed on them, seedlings start from almost every dropping; in the latter instance, all the fermenting acid matter of the pulp had been appropriated in the economy of digestion.

Pear-seeds are injured, not only by being kept moist for a long time, but quite as often in the process of drying, and from being kept too dry. Large masses of moist seeds engender heat, but if the latter are exposed to constant atmospherical drying, the germ of many of the seeds would become greatly injured. Pear-seeds, soon after being cleaned from the pulp, should be separated from each other by some desiccating material, such as sand, charcoal dust, &c. From experience, we have found, that to obtain healthy seedlings for budding or grafting, the seed must be selected from healthy and vigorous trees.

In any part of a pear-growing country, there may be found large, vigorous trees, producing from ten to twenty bushels of small, well-shaped, but unmarketable pears, having large and full developed seed—which fruit can be purchased for a small sum. These should not all be gathered at once, but at three or four periods—obtaining at each time only those that are ripe or nearly so. As fast as they become quite soft, the seeds may be pressed out and sifted from the pomace, and before becoming quite dry, or indeed they may immediately, be mixed with two or three times their bulk of the sand and charcoal dust, &c., and after drying for a few days be preserved until Spring. Much has been said of late about the adaptation of varieties to each other; that is, that certain varieties of pear should be grafted upon those having the same habits of growth. But upon a large scale this is impracticable.

Some English nurserymen prefer the seeds of the Virgalieu, as they are large and full, and Mr. Berckmans has often told me that he has found all varieties do well on the Virgalieu stock. There is little doubt that the stocks produced from the seeds of the more advanced and refined varieties produce fruit, when grafted upon, sooner than in inferior seedlings. But there is the serious drawback, that the finer varieties are shorter lived, and more subject to disease, than the Crab Pear, almost in the ratio of their excellence.

From information of the use of a crab pear, in Connecticut, known as the Perry, and from its great vigor, hardiness, and longevity, I anticipate excellent results from its use as a stock.

After what has been said, it will be almost unnecessary to state that varieties subject to blight; or fruit from trees that have been injured by it, must always be avoided by the seed collector. One cause of defect and failure in trees is, the selection of suckers for stocks. It has been customary for some nurserymen, during the great demand for pear stocks, and their consequent scarcity, to employ the vagrant and wandering families of negroes to grub up the suckers in woods, and around old pear trees, for use in the nursery. Of the disadvantages attending the use of such stocks, it is hardly necessary to speak.

PLANTING SEED—CULTIVATION OF SEEDLINGS.

The seeds should be sown in October, after frost has made its appearance, or in early spring. The former is thought by many to be preferable. The conditions favorable to their growth, are the same as for the best cultivation of trees. The soil should be deep, dry, well pulverized, and moderately rich. When grown in very rich or damp soils, they make a rank, luxuriant growth, but form excellent subjects for that pestilence of the Pear tree—the blight. Indeed, of all seedlings, not exotic, I think the Pear has generally proved the most difficult to grow. If the soil should be poor, the plant is stunted and small; and such plants seldom attain a vigorous condition, and are entirely unworthy of use as stocks for budding.

To secure the proper mean requires good and careful management. The soil should rather be a rich mould from an old pasture or meadow, than one recently manured; and not largely composed of leaf or swamp muck, which would tend to form a succulent and unripe growth. When but a few thousand are needed—the best plan is to form a bed in some dry or well drained spot, in the following manner—for 10,000 seedlings, dig out a space thirty feet by fifty, two feet deep, and return only the surface soil; to this add: earth from old headlands, sods from a pasture, which have been rotted during the previous summer, with three or four loads of leaf or swamp muck, which has been one year exposed, and a similar quantity of well rotted barn-yard manure. These, with a bushel or two of lime, or what is greatly preferred, fifty pounds of super-phosphate of lime, should be thoroughly intermixed; and the seed sown in rows one foot apart. In this manner, if the season should prove to be one of drought, the bed may be watered and shaded from the sun during the hottest weather. It is important to obtain a large early growth; so that, by the first of August, they should be at least a foot to eighteen inches high, and quite stocky. It would be much better if the seedlings could have a greater distance between them; but this peculiar management would be found quite impracticable on a large scale. Newly-cleared wood land, when dry, and cultivated for two years, is favorable to the growth of seedlings; and in all cases, soil which has not before grown fruit trees, must be selected, and nearly or quite as deeply tilled as the bed above described. Unless a good growth is early secured, the plants are liable to two serious disadvantages:

First, if they should continue late in growth, and the early frosts overtake them with succulent and unripened wood, the frozen sap-blight will often destroy them, unless amply protected by removal and burial in the soil. And, secondly, pear seedlings are frequently attacked in the hot mid-summer months by a sort of rust, that appears in spots on the leaves, which soon after ripen, and then the growth ceases.

The only preventives are, to secure a full growth early in the season, or to shade the plants during the continuance of the hot weather.

In the latter part of July, or early part of August, when the growth has become somewhat checked, and many of the leaves are ripening, the tap-roots may be cut by thrusting a long handled instrument—somewhat like a spade, but of half the width, thinner and quite sharp—in an oblique direction, beneath the plants, six to eight inches below the surface. This is practiced in England and France much earlier, say in the middle of June, but is objectionable on account of checking their growth. In the first method, the retiring sap will form new fibrous roots, which will much assist the growth in another season.

In the fall, pear seedlings must always be removed, and the first grown and best rooted selected for the nursery rows, to be budded the next summer. The second quality also is sometimes planted in the nursery for budding the second summer; but seedlings of the third quality, and sometimes of the second, are, the next spring, replanted in the bed—not being sufficiently vigorous for budding. The winter is often fatal to seedlings in the bed, by heaving them out of the ground. They are therefore packed in sand in the cellar, or are buried, top and roots, in close beds, until spring, for preservation.

OBTAINING NEW SEEDLING VARIETIES.

These are the result of accidental or intentional hybridization, or of the natural tendency of the seed to change, both in the character of the fruit, and the habit of the tree. It may be assumed that, although seedlings of pears resemble the parent, yet that no two seedlings, of cultivated varieties at least, produce fruit exactly alike.

The fruit of some of the natural seedlings—that is, those not produced by complex hybridization, and found growing without the aid of art—often reproduce their variety by their seed; or, at least, plants of almost perfect similarity. But there is ever a constant tendency in the most luscious and melting varieties to return to the wild state. Van Mons, of Belgium, who expended a life-time in experiments on the variation of pear seedlings, held the theory, that "wild pear trees, in a state of nature and in their native soils, always reproduced seed without perceptible variation; but that, as soon as the original circumstances are altered, and the seed is planted in a new climate or soil, change commences." His theory is at this time familiar to all, and need be but briefly alluded to here. The pear selected for its seed must have travelled, one step at least, away from the acrid crab. It is essential moreover, that it should not be of the higher order, as he asserted the theory, that at or near the sixth generation of successive seedlings, the highest point of excellence is reached, and a rapid declension begins. I have nowhere seen confirmatory examples of the last portion of his dogma.

The seeds of the variety being chosen, its fruiting was to be accelerated by every means, as the short life of man would scarcely suffice for the six generations required, when the fruiting of each was extended to the natural term of fifteen to twenty years. The seedlings were therefore subjected to root pruning, summer pinching, ringing of the bark and twisting of the limbs, until the sap retarded in its passage was tortured into forming fruit.

The seeds of the first generation, whose fruit would exhibit but slight amelioration, were sown, and the fruiting hastened in the same way, and the seeds sown successively until the fifth and sixth generations were reached. From these he produced a great variety of glorious fruits.

The limits designed for this book will not permit even a hint at the extensive discussion this theory has elicited, but few can doubt at this day, that the cause of the variation in all cases is hybridization through the flowers. I have never seen evidence sufficient to convince me that the continual cultivation of a crab pear would ever alter its characteristics in the individual tree or its grafts.

Amateurs do not, however, cultivate or preserve every seedling produced. Certain indications govern them in their selections in the seed-bed, or soon after transplanting, and those only receive great care and attention which are of promising appearance.

If the leaves of a seedling exhibit an excess of down, or the branches are very thorny, the probabilities are against its proving of sufficient excellence to warrant its cultivation. To these marks of inferiority, I have added, from my own observation, a peculiar bright, deep green, not easily described, a remarkable vigor of growth, an unusual quantity of limbs, and a thick bushy foliage. The formation of fruit for any other purposes than reproduction, or the mere creation of seeds, is an unnatural process—or, in other words, is produced by artificial means. None of our finest varieties of pears equal seedlings in their profuseness of foliage and shoots. In the former, the number of shoots is generally less and the growth much stouter, more stocky and straight.

When this is the appearance of the young seedling, and the leaf is bright and oleaginous, instead of dull and downy, when the petiole of the leaf is long and clean, when the color of the wood is more inclining to purple or yellow than bright green, and when the spurs and spines which appear are blunt, instead of long, sharp, and thorn-like, we may reasonably conclude that a new variety of some excellence will be produced.

If the fruit sets well in spring, and continues to grow, although frosts and blasting winds have injured other fruit, it is a sign of hardiness; and if more than three to six fruits set in a single coronal of flowers, it is a fair signal of great productiveness. More than one season will be necessary to prove its excellence, as many promising fruits, in their first season, have important defects, such as rotting at the core, grittiness, or astringency. Some excellent pears have been discarded as outcasts in their first fruiting, which subsequently proved to be worthy of high rank. It has been advised not to hasten the fruiting of seedlings, by budding on the quince or grafting on older trees, as it is supposed to change the character of the fruits too much for identification in future growth; but for these opinions I can see no good reasons. M. De Jonge, of Brussels, says:

"A bud inserted near the ground in a quince stock, will produce fruit in the third or fourth year; and, though the wood may acquire a different tinge, yet the form of the fruit will remain the same, although some varieties may be larger, of richer flavor, and in greater abundance. These effects are, however, exceptions, and are attributable to the sort of quince, of which there are several varieties, differing as widely in their influence on the Pear, as the varieties of the wild pear employed for stock."

The period of time required to prove a new variety will exhaust the patience of most persons. Three years will be required to judge if the seedling promises sufficiently to encourage its cultivation; seven years more, with pruning and good cultivation, to produce fruit; five years more, of successive fruiting, to definitively test its quality, and correctly determine its worth.

Fifteen years of extra care and attention are thus required to prove a single variety; and if to this we add ten years more, before it can be extensively known and cultivated, we may see how slowly the labors of the pomologist are crowned with success, but this period may be abridged one-half by working upon the Quince.

In Mr. HOVEY's splendid collection of American Seedling Pears are some of remarkable promise. Among those termed by Mr. HOVEY, Dana's Seedlings, are several which are admitted by such excellent judges as Mr. LOUIS BERCKMANS, to possess signs of rare goodness.

Many seedling collections would amply repay the labor and cost bestowed upon their cultivation; while in others, labor would be entirely thrown away upon thousands of worthless varieties, without securing one valuable sort.

HYBRIDIZING.

It is often desirable to combine the qualities of two pears in a new variety, and this is practicable only through their flowers. When the blossoms are about to open, inclose the cluster selected with a lace bag, and when perfectly expanded, cut away the stamens or male organs of the blossoms, and with a small color-brush gather the pollen from the anthers of the variety with which it is designed to cross, and impregnate the pistils left standing in the blossoms—which should again be inclosed in the lace bag until the petals fall (Figs. 1 and 2). The seeds taken from this fruit, when ripened, should be planted with care, and a full detail of the double parentage noted. It by no means follows that these seeds will all produce the same fruit, for the original varieties from which they have been derived will exercise more or less influence in causing them to vary.

The stamens when cut away must not be ripe enough for their pollen to communicate with and fertilize their own pistils. The pollen used for impregnating must be ripe and powdery, and the stigma of the pistil must be damp. It was in this way that Mr. Knight produced his Monarch, Dummore, and other fine Pears, though the general results of this process do not seem to be remarkable.

Fig. 1.

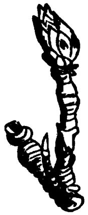


Fig. 2.

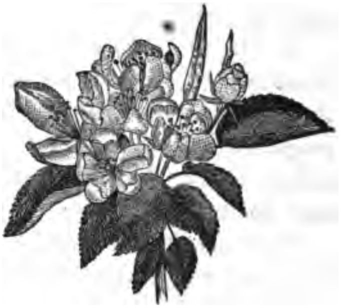


Fig. 1 A fruit bud near blossoming.
Fig. 2. Represents a coronal of flowers from a single bud.

Mr. Louis Berckmans, from whom I have freely drawn information for this work, has some 30,000 seedlings of his own propagation and of collections from Van Mons, Esperin, Bivort, Dr. Brinckle, and other eminent pomologists, which he has selected by various marks and tokens which are eloquent to him in prophesying the merits of their fruits. He does not, I think, after a long experience, pay much attention to artificial hybridization for producing new varieties.

Notwithstanding the splendid results of a systematic improvement of the Pear, and the noble fruits obtained by the gentlemen named, we have been indebted to accident, or rather to the voluntary contributions of Nature, for those pears which rank the highest in beauty, flavor, and general excellence. The Duchesse, found in a hedge at Angers; the Seckel, in the woods of Pennsylvania; the Virgalieu, the Bartlett, and the Louise Bonne de Jersey, whose origin is not believed to be the subject of design, all confirm this view; while we must acknowledge that there is a delicacy in the constitution of many of the pears obtained by scientific propagation, that renders them inferior to the accidental varieties.

In fact, the superior vigor and hardiness of those varieties obtained through accident, alone enabled them to survive the neglect and difficulties under which they sprang into existence; the high-flavored, large, and truly splendid varieties produced by scientific skill and high cultivation, maintain their superiority only under the conditions in which they were nurtured. I have seen the Duchesse d'Angoulême growing on quince stock, for twelve years, in a grass plot, without attention, where it had been planted when twenty years old, and yet producing large, melting fruit.

A Flemish Beauty, Beurré Bosc, or Beurré Diel would have succumbed under this treatment long before.

LEAF-BLIGHT OF SEEDLINGS.

Leaf-blight is the terror of nurserymen, and when it makes its decided appearance, his hope of success for the season is at an end.

The disease is not necessarily fatal, but when plants in the seed-bed are attacked by it, the cultivator will almost desire that they had perished outright; as great numbers of them will be checked so prematurely in their growth, as to be unable to endure the rigor of the next winter.

On the first appearance of the disease, small brown spots are seen upon the under side of the leaves of the weaker plants in the seed-bed or nursery rows, which spread quickly over the whole leaf, and in a few days, over the entire collection of plants. Growth stops at once, the leaves fall, and budding for that season is of course prevented. At this period all nostrums and chemicals are useless. The fact that this disease prevails most in old nursery grounds, and indeed is almost confined to soils long cultivated, points to the necessity of restoring to the soil its original qualities, or of planting only in new soils. The disease is doubtless of fungous character, and as its appearance on the leaf would indicate, is highly contagious. As remarked twenty years since, it is much more prevalent upon the leaves of seedling stocks than upon those of budded and fine varieties. Buds set in stocks attacked with this pestilence, and which have sufficient vitality for growth, produce healthy trees, whose leaves remain unspotted. This has afforded a curious subject for speculation among pomologists.

Mr. Downing supposed this disease to be identical with the cracking and cankering of the fruit of some varieties.

Some kinds of pear trees in bearing in my grounds are slightly attacked every year, but the disease makes no progress; the small number of leaves affected drop off, and growth commences again, though the fruit does not acquire more than half size. The best preventives are: to plant in new, deep, and rich soils; to cultivate well and obtain a good, strong growth before the first of August.

An article upon this subject, exhibiting evidence of close investigation, and containing suggestions of much value, was written for *The Horticulturist* some years since, by Mr. H. E. Hooker, of Rochester.

PROPAGATION BY LAYERS AND CUTTINGS.

With the Pear this is always a difficult process, and requires nice management. If the theory regarding the necessity of affinity between the stock and the graft is worthy of attention, propagation by layers is important, for nothing can be nearer in affinity to a variety than the variety itself. Some varieties are much more easily propagated in this manner than others, but when the proper conditions are observed, success is attainable with all. When the leaves are ripening in the early part of August, the lower shoots of the present year's growth should have the bark and sappy wood cut through on the lower side, to about one third of the diameter of the shoot. Sometimes a ring of bark about an eighth of an inch wide may be removed entirely around. The shoot is then bent down into a hole (care being taken not to break it at the cut), and covered with fine soil, tightly packed. The retiring sap from the ripened leaves is arrested at the incision, and there forms rootlets. I have succeeded by this method in producing handsome trees from about one half of the branches layered. When it is desirable to do this somewhat extensively, a "stool" may be formed by cutting off the tree about a foot above the ground. The next season there will be produced a dozen or more thrifty shoots from a tree two years old, which may all be layered as above described. When the shoots are too high for this kind of treatment, incisions may be made in them, and balls of clay and cow-dung mixed together put over the incisions, inclosed with matting, and tied.

QUINCE STOCKS.

These are always propagated by layers or cuttings. Any attempts at propagating by seeds would evidently be unsuccessful in producing a uniform variety fitted for budding with the Pear.

The Angers and, latterly, the Paris varieties of the Quince, are the only ones in use for this purpose. The qualities needed for stocks are: free, rapid growth; a tendency to a large size so as to equal the pear trunk, and to root freely from cuttings or layers; to have a cellular and ligneous formation that will fit them to unite readily with that of the Pear. In those varieties that refuse the Pear, or on which it makes an imperfect union, we shall perceive by examining the fracture where the pear wood cleaves from the Quince, that the adhesion has been produced simply by the irregular and grooved surfaces of the wood of the bud and the stock, fitting into each other without any intermingling of the ligneous fibres of each, although the bark of the two species has united to form a sheath over the imperfect union. That intermingling, and continuation of woody fibres, which takes place between a bud and its stock of the same species, does not here exist. There is, then, only a mechanical adhesion of irregular surfaces, held together by a sheath of bark.

The apparent antipathy of some varieties of the Pear to the Quince is, doubtless, owing to the resistance made by the different texture and cellular formation of the Quince to the returning sap.

It is probable that, the cells of the Quince being smaller than those of the Pear, the inspissated sap of the latter, on its return, has become too rich in albumen to pass into them; but sufficiently accurate microscopic experiments have never been instituted to pronounce decisively upon the theory.

The tubes of all woody formations are not continuous, but successive—like the joints of bamboo: the upper ends being smaller, and fitting into spaces between the lower ends of the next higher series. It is commonly known that water will not pass readily through the smaller tubes, in which alcohol and ether easily flow. From the same cause, probably, the richer juice of the Pear will not flow in the smaller tubes of the Quince; and the consequence is, that a swelling out of the Pear at that point is formed by the repelled juice which, not finding a free passage, produces no ligneous fibres or cellular tissue in the Quince.

PROPAGATION OF THE QUINCE BY LAYERS AND CUTTINGS.

The Quince forms a notable exception to all other fruit trees in its ability to form roots readily from any part of its bark. The propagation of the Angers Quince, by layers or cuttings, is manifestly only a continuation of the original individual tree.

The cuttings should be made in the fall or winter—not later than January, since the buds will begin to swell in the early, warm days of winter. It is desirable that the buds should remain in a completely dormant state, so that they can make no demand upon the cutting for sap until rootlets have pushed out, and given the cutting ability to furnish it without exhaustion. It is not generally considered that roots are never added by influences exterior to the plant, but are the product of the plant itself. The roots of a cutting are formed by the sap contained within itself, which, exuding as healing lymph, is changed into roots under the peculiar conditions of air, moisture, and darkness—which process goes on even in winter, when the ground is not frozen. It will be seen, then, that those plants formed with large evaporating organs in the bark will not readily root, as they part too easily with their sap. The close, dense bark of the Quince, and the hard rind of the outer wood of the Grape peculiarly fit them for this method of propagation; and we consequently find that, out of thousands of cuttings planted of the Angers variety, but few fail of rooting.

The cuttings should be planted as early in spring as possible, although their vitality is so great as to survive almost any treatment, in soils fitted for them. During a rather wet June, while trimming some quince stocks, preparatory to budding in August, I directed the trimmings, then in full leaf, and with some inches of new growth, to be planted in the adjoining ground, which was so sandy and poor that it had been left unplanted. Even with these disadvantages, more than half took root, and made fair plants.

The cuttings should be from eight inches to a foot long, and planted so as to leave an inch or two of buds above the surface of the ground. The soil should be rather clayey, and retentive of moisture. When it is light, it should be packed firmly around the cuttings with the foot—the closer the better. Cuttings of the Quince will usually succeed more uniformly in rather damp soils, but will not so uniformly grow thrifty when transplanted to drier grounds.

Fig. 2.

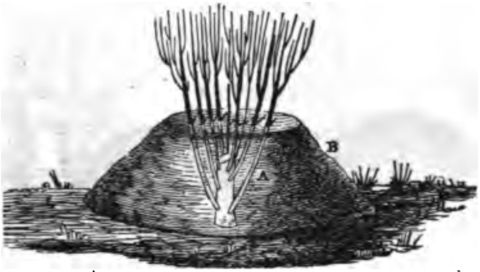


Fig. 2. Mother Stool, and usual Plan of Layering Quince Stocks.

Quince stalks are, however, produced in much greater quantities by layers from permanent plantations of stools. These are made by planting quince roots about four feet apart, in very deep and richly manured soils, and cutting back the growth every year near the ground. This treatment forces up a large number of thrifty shoots, which increase in quantity as the stock grows older.

As usually practiced, in the latter part of August, the earth is heaped up, and firmly packed around these clusters of shoots or stools, as in Fig. 3.

The shoots throw out roots immediately, but are not usually separated from the stock till the autumn of the following year. It has not been customary to commence earthing up before the second spring; but we have found it of essential importance to do it earlier, so as to secure the benefit of the concentrated sap of the fall.

Fig. 4.

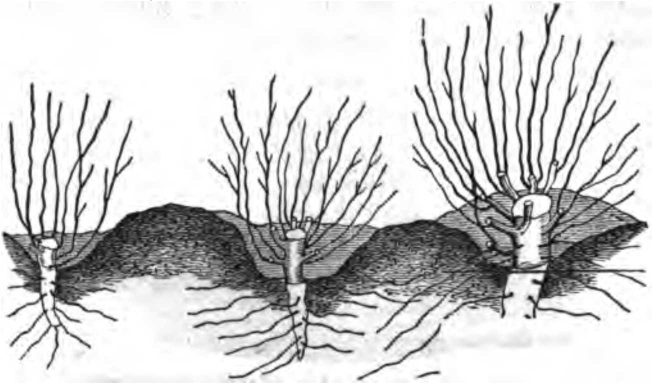


Fig. 4. Treatment of Stools in the first, second, fourth, and fifth years.

A much better plan, practiced by Mr. A. S. Fuller, is shown at Fig. 4. The stool is planted in a trench, which, as the former increases in size, is, at the earthing up of each successive crop, filled higher and higher, until, at the removal of the fifth crop, the stool is dug up, the lower part of the root removed, and the upper and more vigorous portion replanted.

PLANTING STOCKS—SOILS SUITABLE, ETC.

It is of the highest importance that only the very best rooted plants, either of quince or pear, should be planted in the nursery. Mr. Barry, than whom there is no higher authority, says, in his excellent work, "The Fruit Garden," that "one hundred good, vigorous stocks are worth five hundred poor ones;" and some of us will live to see the day when customers will pay five times more for a perfectly healthy, well-grown tree, than they will for a poor, or even a medium one." There are a few purchasers now of the same opinion. It has been customary to crowd the nursery rows with all the plants that promised to survive, planting them only eight inches apart, and to bud them all, without discrimination, during the following summer. The consequence has not unfrequently been, a feeble growth from those buds that barely survived; a thrifty growth in the vigorous and healthy stocks; and complete failure in one half of the number planted.

When stocks are strongly rooted, they should be planted in the fall—provided the ground is ridged up against the rows, to prevent heaving out in the winter. If weakly rooted, and no extra care is intended, they should be buried in light, dry soil, placing the roots thickly together in a trench, and filling it up within a few inches of the top. This should be done early, in order that the ground may be firmly settled by rains, and packed about the roots before it is frozen.

As early as the condition of the ground will permit, the stocks so treated should be planted in nursery rows, or bedded out. In bedding out, the weaker stocks may be planted thickly, or only two or three inches apart, in rows, at a sufficient distance to permit plowing between. The soil should be strong and deep, and the plants receive thorough cultivation. The nursery ground should be deeply worked, and well manured a year previous to the planting of the stocks, in order that the application of fresh and powerful manures may not induce a succulent and unripe growth.

The method of preparing a plot of ground planted recently with stocks, may not be inappropriate to this section. The soil was a sandy loam, half an acre of it being filled with boulders, varying from the size of a paving-stone to those weighing five hundred pounds each. As these stones were reached by the plow, they were removed by laborers with spades and crowbars, and placed on the surface of the plowed land. When a furrow had been cleared of stones, the subsoil plow was drawn by a stout team in the bottom of it, loosening the subsoil to the depth of six inches. This loosened earth was now thrown out by the common plow, and the hard soil again deepened by the subsoil plow, until the whole depth of loosened soil was from sixteen to eighteen inches. The ground was then cross-plowed, harrowed smooth, furrows drawn four feet apart, and deepened with a spade. Thirty thousand pear stocks were then planted one foot apart in these trenches. The whole expense for labor was as follows:

8 days' labor of team and man, in plowing and subsoiling, at $4	$32 00
3 days' labor of 3 men to loosen and remove rocks and stones, at $1	9 00
1 day's furrowing by double plowing	4 00
27 days' deepening trenches, at $1	27 00
20 days' planting stocks	20 00
	$92 00

If double the labor had been devoted to deepening the soil, it would have been an economic expenditure. Great care should be exercised in securing the trees in straight lines, as a tree projecting from the row is liable to injury from the plow.

The soil must be dry and rich, and the use of that common but vaguely defined term must not be misunderstood. Properly expressed, the soil should be fertile without having received recent applications of strong manures.

MANURES FOR NURSERY STOCKS.

To stimulate a vigorous growth early in the season, an application of from three hundred to five hundred pounds of guano per acre is highly approved. It should have been composted for a month previous to use with forty times its bulk of well pulverized swamp muck, which has been exposed to the frosts of at least one winter after digging. This stimulating compost, however, should be applied in the Fall, after growth has ceased, well distributed, and plowed in on soils otherwise in good condition. A strong and stocky growth of trees will ensue, and as this energetic and volatile manure will have exhausted its power by midsummer, the young wood will ripen fully, and become hard and firm. A much more perfect manure for the development of young trees is formed from a mixture of guano and superphosphate of lime. This I prepare each winter, and have found most excellent effects from an application of six hundred to one thousand pounds per acre in the strong, healthy growth and early fruiting of almost every tree to which it is applied.

To prepare this quantity of superphosphate, use three hundred pounds of burned bones, or four hundred pounds of ground, unburned bones dissolved in one hundred and fifty pounds of strong sulphuric acid diluted with twice its bulk of water, adding one hundred and fifty pounds of Peruvian Guano; the whole to be thoroughly intermixed. The excess of acid changes the volatile carbonate of ammonia in the guano to the soluble but non-volatile sulphate, which is slower, and not corrosive or injurious in its action on plants. The resulting mixture being in a semi-fluid state, some absorbing material will be needed to act as a divisor. Peat or swamp muck, nearly dry, will be the best substance, and may be used in large quantities, being itself composed of the ligneous and carbonaceous products of the growth of wood. This compost may be spread broad-cast, or strewn in furrows plowed near the rows. The necessity of furnishing the elements found in this manure may be seen at once in the chemical analyses of the Pear, its bark and wood.

On the farm of Prof. MAPES, several varieties of pears, which with us have not hitherto maintained their European reputation, have been produced, of great excellence, by application of the phosphates. The fruits were pronounced by Louis Berckmans, Col. Wilder, and others, the finest of their kind ever grown in this country.

A study of the following analysis will show the necessity of using potash in addition to the elements found in the superphosphate and guano, which may be supplied to the soil in the form of crude potash, green sand marl, or woodashes. Neither ashes nor potash should be mixed directly with guano or stable manures, or so placed in the soil as to come immediately in contact with each other.

ANALYSIS OF THE ASHES OF THE PEAR.

One hundred pounds of fruit yield nearly half a pound of ashes, the wood and bark much more.

ASHES OF	HEART WOOD.	BARK.	FRUIT.
Potash....................	27·00	6·20	54·69
Soda......................	—	—	8·52
Lime......................	23·14	33·36	7·98
Magnesia..................	3·00	9·40	5·22
Sulphuric Acid............	0·45	1·80	5·69
Silicic Acid..............	0·30	0·40	1·49
Phosphoric Acid...........	10·40	3·50	14·28
Phosphate of Iron.........	0·80	—	2·00

PREPARATION OF STOCKS FOR PLANTING.

The small cost of stocks has induced a careless method of planting, and a more inexcusable neglect in preparing them for it. Quince stocks are usually taken from the mother plant or stool by a quick jerk, which leaves a large ragged end; as it strips off the bark and wood from the stool, for a space at least twice the diameter of the stock. At the season when this is performed, no healing lymph exudes, and of course, no rootlets are produced; besides, the rugged wound does not encourage their formation. A raw, unhealed end always remains; and of some thousands of pear trees upon quince roots, which I have removed, I have never seen fibres put forth, where such a wound has been made. The rough corrugated ends will show the marks of the rupture made by their violent removal from the parent stock.

The injured roots of stocks should be smoothly cut, and the jagged portions cleanly pruned away, leaving a surface, from which fresh rootlets will readily spring.

In the violent removal of the stock, the bark is stripped from nearly all of the fibrous roots; and if they are not removed, a large mass of decaying organism must be thrown off, before a healthy vitality can commence.

When the fibres are thick and matted, they should be cut back to an inch in length, or they will be pressed together in the soil, and decay. Two rootlets or fibres never come in contact when growing, and this condition should be accurately imitated in planting.

Pear seedlings, which have not been root-pruned in the seed-bed, have long tap-roots, which should be shortened to six or eight inches. It has been recommended to lay out the tap-root in a horizontal direction; but the distorted position obstructs the free flow of sap; and the root receiving nutriment from only one direction, the tree will be distorted by growing mostly on the same side.

The tops of stalks are frequently allowed to remain;

but they should be well pruned, in order to induce a new and large-leafed growth to prepare sap that on its return will strengthen and unite the bud to the stock. When all of the top is allowed to remain, the leaves will be small, and but little new wood formed, while close pruning would induce large and vigorous leaves capable of preparing great quantities of well aerated sap.

Fig. 5. Fig. 6. Fig 7.

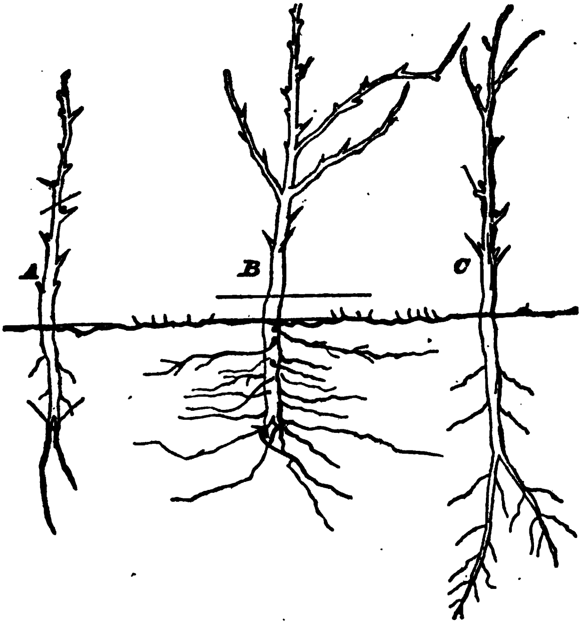


Fig. 5. A seedling of one year's growth.
Fig. 6. The same at two years, after root pruning.
Fig. 7. The same at two years, with pruning.

The contrast between Figs. 5 and 6 is not too strongly pictured, to represent the real advantages derived from root and top pruning. The pruning of the top should always be done before planting, as the roots do not obtain sufficient hold of the soil to prevent their being disturbed and pulled out by the knife.

INFLUENCE OF THE GRAFT UPON LONGEVITY.

The increase of the number of trees of a given variety has for some years been considered as a simple extension of the original tree of that variety. Grafts or buds taken from any variety of the Pear, when inserted into a pear stock, will entirely change its characteristics, and enforce the production of their own variety of fruit. Having this power, it is not too much to believe, that they have that also of carrying with them whatever defect of constitution, or feebleness of vitality, may infect the plant, and that trees produced from them would be feeble or strong, short or long-lived, in proportion to the possession or want of these qualities in the original.

That the defects of a tree must limit the powers of all its descendants, is a well known physiological fact. But the different trees of a variety are not descendants from an original of that variety, but only parts of it; and starting from this basis, some pomologists have asserted, that as all the trees of any variety are but branches from the original, and not the product of fecundated seed, they must be limited in their existance by the life of the original.

In this theory, however, sufficient allowance is not made for the increase of vitality, by alliance with a vigorous stock, which is the product of a seed; and hence possesses the elements of independent life, and the power of infusing much of its own principle of longevity into the engrafted scions or buds.

It would be more nearly correct to say, that the duration of a variety is limited more or less by that of its original, and that any inherent disease in it will be continued, in all its buds and grafts, although the superior vitality of the stock may mitigate its virulence, or protract its dormant period.

Certainly, a settled conviction is obtaining among pomologists, that some of our finest varieties, that have been in existence for but the short time of fifty to seventy years, have nearly reached the culmination—as they can now only be produced, in any degree of excellence, by the utmost care.

The White Doyenné, the Chaumontel, and others, are notable instances of the justice of this conviction. Some localities still produce fruit of these varieties of great beauty and excellence; but even there, the invisible hand of disease has stealthily touched their fruits, and the plague-spot is appearing upon their golden cheeks.

The influence of the stock upon grafts is very marked. The fruits of early summer varieties are retarded in their ripening when grafted upon winter varieties; and pears that should keep until Easter, will ripen in December, if the tree which produced them was grafted upon a summer variety.

Similarity in growth and color of wood, and in style and color of leaf, between stock and graft, is important in attaining perfection, but impracticable on a large scale.

METHODS OF GRAFTING.

Scions for grafting should be of one or two years' growth, that have not yet produced fruit-buds. The shoots selected should be firm-wooded and stocky, with buds close together, as a strong, healthy growth is characterized by these marks.

Grafts taken from the upright shoots near the top of the tree are apt to make a vigorous and upright growth, but are more tardy in bearing. Taken from the lower part of the tree, they produce a more widely-spread form, and fruit earlier.

The trees from which the grafts or buds are taken should be healthy, and have produced a vigorous growth during the previous season, but such as have at any time exhibited symptoms of frozen sap-blight should especially be avoided.

Varieties which succeed but indifferently on quince stocks, ought not to be propagated by scions from trees grown on quince. Indeed, it is a mooted question whether grafts should be taken at all from such a source; but I see no reason for going to this extreme.

The part of the graft used with the most success, is that at the junction of the spring and midsummer growth, which is marked by a somewhat fainter annular swelling than that at the commencement of the spring growth.

The theory of grafting is, that the newer tissues of woody growth unite, when brought into contact, if their sap-vessels are not indurated by age. The termini of the cellular tubes are capable of exuding the albuminous deposit of the sap, which unites the graft to the new wood of the stock.

It is not unfrequent that thrifty grafts of two or three years' growth are blown out of the cleft in the stock; and it will always be found on examination that only the bark and extreme rind of sap-wood have united, while on the remaining surfaces, woody matter has been deposited without adhesion.

When grafts are procured from a distance, or it is necessary to keep them some time before use, they should be cut in winter, or early spring, before the buds have swollen, and packed away in moderately damp sand. If allowed to be too wet, they will decay, and if exposed to evaporation, they will wither. The graft should be in a less advanced condition than the stock, as during the process of adhesion, evaporation from the bark goes on rapidly when the sap in the graft is active, and death ensues, because the supply can not be maintained.

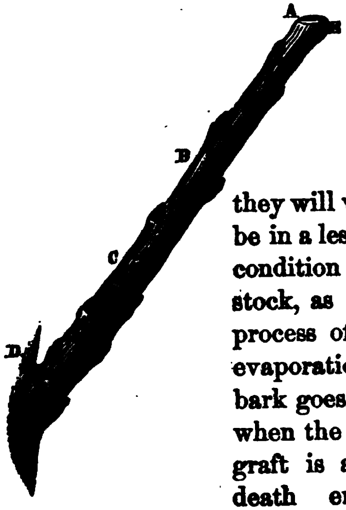
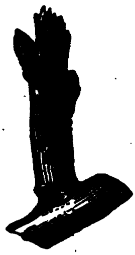


Fig. 9.



Grafting of the pear is usually performed only on large-sized stocks or upon bearing trees, except in

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* Fig. 8 represents a branch, exhibiting wood-buds, in the best condition for a graft.

† Fig. 9 represents a branch with fruit-buds, unfit for a graft.

nursery stocks, where buds set the previous season have failed. On the smaller stocks, of one to four years of age, budding is by far the preferable method of propagation.

Fig. 10.

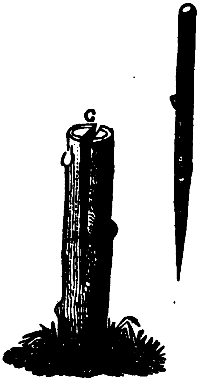


Fig. 11.

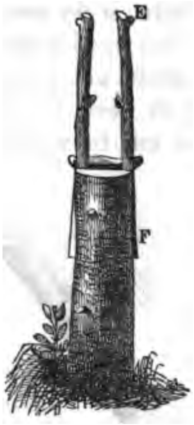


Fig. 10. Cleft-grafting with single graft.
Fig. 11. Cleft-grafting with double grafts.

When the trees are large, only the younger and thriftier limbs should be grafted; but when all the branches are old, and covered with rough bark, a sufficient number of them should be shortened, in order to induce new growths, on which the grafting may be performed, as shown in Figs. 11 or 13.

Thousands of pear trees, almost gigantic in their size, in all parts of our country, now bearing only the most acrid fruit, could each be made in a few years to produce almost a wagon-load of the finest pears.

When it is desirable to graft small stocks, it should be done by the process known as whip-grafting, as illustrated by Fig. 12. In Fig. 13, the cleft, which is a simple split, is exhibited open, as it would be after the insertion of the parts. Cleft-grafting is usually performed on stocks of more than half an inch in thickness—as shown by Figs. 10 and 11.

Fig. 12.

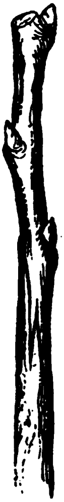
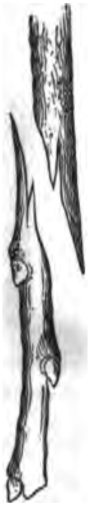
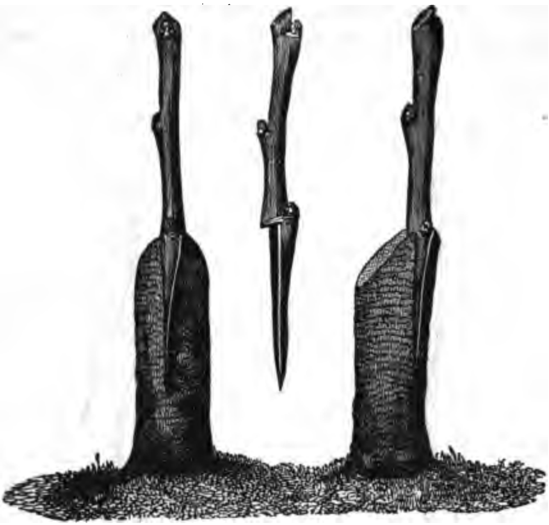


Fig. 13.



All of these operations can be performed during a month or six weeks subsequent to the first swelling of the bud, or from the fifteenth of March to the first of May. The exposed surfaces should be well covered with grafting-wax. Crown-grafting, as shown in Figs. 14, 15 and 16, is performed by cutting the graft only upon one side, leaving a square shoulder, and pressing it down between the bark and the wood. More than one graft may be set in a large stock. The cleft in the stock, and the exposed surfaces, where the latter has been cut, should be well protected by grafting-wax. This is commonly made to be used when cold by melting three pounds of resin, to which three pounds of bees'-wax and two pounds of tallow are added. After stirring together, so as to incorporate the ingredients, the whole may be poured into a tub of cold water, and worked with the hands.

Fig. 14. Fig. 15. Fig. 16.

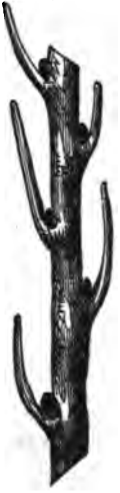


Figures 14, 15, and 16. Graft and Crown-grafting.

BUDDING.

While pear trees may be propagated with a measure of success by other methods, it is by budding only that they can be raised in large numbers with economy and entire success. The constitution of the Pear especially fits it for this process.

Fig. 17.*



The firm, tough bark of the stock, and the abundant coating of mucus which lines the interior of both the bud and the stock, enable the operator to effect a clean separation of the bark from the wood, without injury to the texture of either. The ripe mucus sap secures an almost immediate union of the parts. In growing the Pear upon the Quince; the superiority of this method of propagation is still more marked. Mr. Rivers says: "of twenty grafts set in quince-stocks, it not unfrequently happens that nineteen will live, but nearly as often that nineteen will die." In my own experience with trees grafted upon quince-stock, they have proved to separate more easily at the junction than trees propagated by budding. It is only the bark, and the more recent formations of wood, which unite when brought into contact; and this union is effected by layers of wood, deposited around the junction, in the glutinous condition of lymph.

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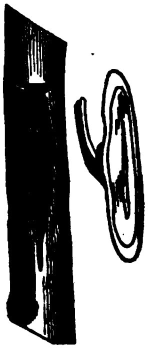
* Fig. 17, represents a stick of buds, with leaf-stalks for handling.

Fig. 18.*



These facts show that a bud, composed, as it is, only of bark, and of alburnum or half-formed wood, presenting a great surface of fresh material, will form a more rapid and complete union with the stock than an ordinary graft. In this country, where thoroughness in the performance of work is often sacrificed to rapidity, it is the general custom to leave a portion of wood within the section of bark connected with the bud, as seen in Fig. 18. This arises, in part, from the difficulty of separating the wood from the bark without disturbing the chit beneath the bud, the retaining of which is essential to success in budding. This small kernel of coagulated albumen, as shown in Fig. 19, is the stored-up material on which the bud feeds when quickened into life, and which connects its vitality with the wood beneath. To remove this deposit would insure the death of the bud, or at least allow but a feeble growth. By carelessly taking out the wood from the bud, the chit would adhere to it, and thus be displaced—as in Fig. 20.

If the wood be left in the bark, as in Fig. 18, the edges of the bark of the bud would unite with the stock—the vital circulation being thus established. But this piece of wood is a foreign substance, and the union will be much more perfect when the whole interior surface of the bark of the bud is allowed to come in contact with the wood of the stock. From my own experience, I have learned to estimate trees produced by this method much more highly than those budded in the more common manner. They form a stronger union, and resist the pressure of heavy winds without cleaving apart at the junction of bud and stock. Several methods have been adopted for the rapid and efficient removal of the wood from buds, but none of them admit the possibility of the insertion by one man of 1200 to 2000 buds in a single day, as is claimed by some persons.

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* Fig. 18 shows a cut bud with the wood remaining, and figure of bud inserted.

An admirable plan is shown at Fig. 21. The process, consists in thrusting the tough, but not harsh edge, of a quill, under the upturned edge of wood, and pressing it firmly and gently forward; the chit is cut smoothly from the wood, and remains in its proper place, attached to the bud.

Fig. 19.

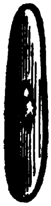


Fig. 20.

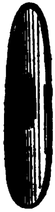


Fig. 21.

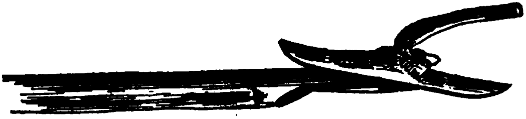


Fig. 19. A bud with the eye preserved.
Fig. 20. A bud with the eye removed.
Fig. 21. Quill as used in separating wood from the bud.

The thickened mucous sap which lines the bark, and covers the wood, when closely examined, will exhibit a cellular structure of albuminous materials attached to the chit, ready to extend themselves into the shoot, which the dormant bud will ultimately form.

Fig. 22.

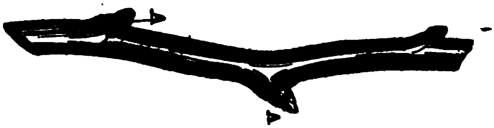


Fig. 22. Stick with bud at A, too high-shouldered for setting.

The operation of fitting the bud to the stock, after each is cut, should be performed almost instantaneously. This is equally necessary to prevent the drying, and the chemical change of the exposed sap, which almost immediately oxidizes, and turns brown—like the flesh and juice of an apple, when cut and exposed to the air.

Fig. 23.

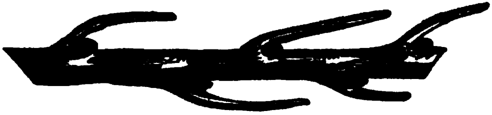


Fig. 23. Stick of buds, selected properly.

For budding, select young, vigorous shoots, of the present year's growth, with well-ripened buds, as shown at Fig. 23. Cut off the leaves, allowing the foot-stalks to remain attached to the bud, serving as a handle when the bud is fitted into its place in the stock. Reject the upper and unripe buds, selecting only the plump, well-ripened ones. Hold the larger end towards your body, inserting the knife-blade as far above the bud as you intend to leave the bark below it, and separate the bud, with a rather deep cut into the wood, as shown at Fig. 24. Hold the removed bud by the foot-stalk, and with the quill take away the woody portion. If you choose to leave

Fig. 24.

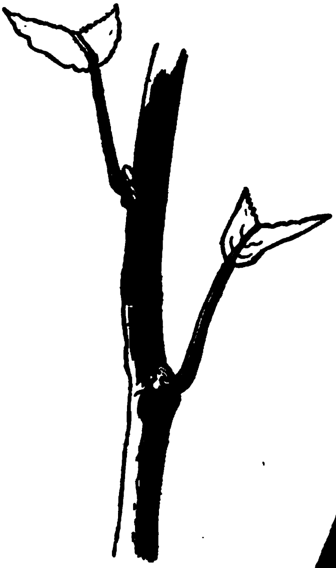


Fig. 25.

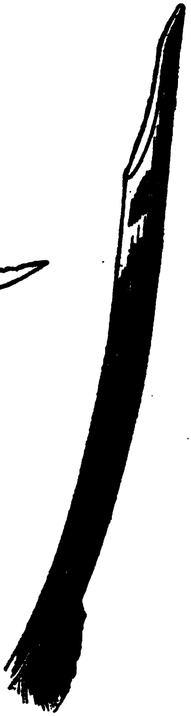


Fig. 24. The proper cut to be made in separating the bud.
Fig. 25. Quill prepared for separating bud from the wood.

the wood, pare it down as thin as possible. If you are not expert in the manipulation, shield the bud from the air by placing it in the mouth, or in a vessel of water. Make the incision quickly in the bark of the stock, as in Fig. 26; raise it from the wood, and push in the bud, by the leaf-stalk. You may now cut off the bark above the bud, so that it will exactly fit the cross incision, and tie the whole gently, but firmly, with strips of bass matting, as at Fig. 27. The ties should be loosened in two or three weeks after the budding is finished, and entirely removed before winter sets in.

Fig. 26.

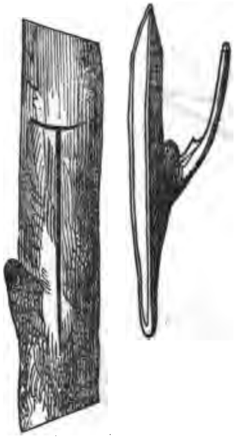


Fig. 27.

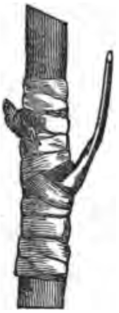


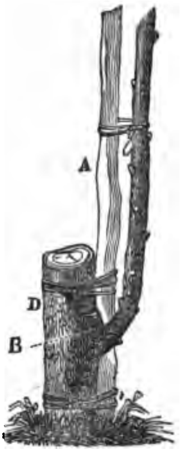
Fig. 26. Bud with wood removed, and stock cut for insertion.
Fig. 27. Bud inserted and tied.

Budding is occasionally performed in spring, but not to any extent in commercial nurseries; nor is it universally successful, although a convenient process, when buds which were inserted the previous summer have failed.

The period for budding the Pear extends from the middle of July to the middle of September—the precise time depending on various local circumstances which affect the growth of the tree. The season may be a late or early one, or a poor soil may have retarded, or a rich one stimulated the growth, so as materially to affect the period for budding. Dry summers and late spring planting of stocks will also retard the operation. The observation of the following points will assist in selecting the proper time for budding. The first or spring growth of leaves should be fully ripened, and the midsummer growth nearly completed. At this time, an abundance of ripened or richly albuminous sap is thrown between the bark and wood, and when both the stock and the bud are in this condition, union is readily effected by the hardening of this sap into tissue.

The stock should be cut three or four inches above the bud, as shown at Fig. 28, soon after the leaves start, although with very strong and well rooted plants, care must be observed not to deprive the plant of all its top, until the bud has put forth a shoot some inches in length. As soon as the latter has grown to nearly a foot in height, it should, if inclining from the perpendicular, be staked and tied. Occasionally, the stump of the stock will afford sufficient stay for the support of the shoot without the use of a stake.

Fig. 28.*



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* Fig. 28 represents the treatment of the budded plant during the first summer.

PART III.—SELECTING, PLANTING, AND CULTIVATION.

SELECTING PEAR TREES FROM THE NURSERY.

Every fruit grower should either select his trees for himself, or obtain the services of a competent person. There are so many circumstances governing the success of nursery trees, so great a difference in their growth, and their roots, as well as in the manner in which they are taken from the ground, that the most careful attention is necessary to avoid the numerous chances of failure. The soil on which the nursery trees have grown is a subject of some consequence. It should be one well suited to the *permanent* growth and fruiting of the trees. Some nurserymen, in order to meet the quickened demand for large and handsome pear trees, stimulate their growth by profuse applications of manure. This practice will produce a succulent unripened growth, and the trees, when planted in an inferior soil, are either killed by winter-blight, or languish for several years.

An instance is narrated of a nursery which was advertised as containing immense numbers of pear trees, which was said to have been manured at the rate of two hundred double wagon loads per acre.

One large nursery of pear trees, which came under my observation, was located upon the bed of a drained mill-pond, the water still standing at two or three feet below the surface in the ditches, which were dug at such distances apart, that the water rose to the surface between them. On this alluvial soil, an enormous growth was obtained, but at the expense of the healthfulness of the trees. Of some fifteen hundred pear trees obtained by the author from this ground, nearly half perished by blight during the first year. Other nurseries may be seen located on imperfectly drained alluvial soils. Pear trees grown on such grounds are always deficient in fibrous roots, and consequently less able to bear transplanting.

Disappointment, also, often attends the selection of trees transplanted from poor and neglected soils, particularly those that are light and sandy. The plants acquire a stinted habit of growth, from which they seldom or never thoroughly recover.

The purchaser should observe if lice or other parasitic insects have made a lodgment upon the trees, and guard against domesticating a pest which it will require years to exterminate. Trees infested by them in the nursery, are generally stunted, and their growth, for a longer or shorter time, retarded.

In selecting plants for pyramid trees, choose those that have branches or branch-spurs within a foot of the ground, and fairly distributed along the stem. It will be impossible to find trees in any considerable number with the branches perfectly arranged, still those only should be selected for this purpose which approach the standard as nearly as possible.

The stem or trunk of a healthy nursery tree will usually be twice the diameter near the ground that it will be three feet above, and decrease with a regular taper towards the top. Stems that are of the same size at the collar, and three, or as sometimes happens, even five feet above it, have been forced up in their growth by crowding in the rows, or by injudicious pruning. The height of trees should be a secondary object compared to other qualities. The bark should be clean, of a lustrous appearance, and free from ungainly scars from wounds made by the pruning knife.

Nurserymen are often forced, by the popular preference for tall trees, to prune them contrary to their judgment, so as to induce growth in that form: the lower part of the tree, deprived of its portion of the foliage, remains undeveloped, while the top is increasing at its expense.

The purchaser should ascertain, if possible, how old the trees are, and how long they have stood in the nursery rows without being lifted, or root-pruned; for a tree of any kind, and especially a pear tree, will not be well provided with fibrous roots within the circle dug in taking it up, after standing for three or four years, without root-pruning or transplanting; nor will a pear tree form these fibrous roots, on which depend its vitality and fruitfulness, unless the stock, on which it was budded, has been properly treated for their formation. It is the practice in some of the French nurseries to cut off the tap-root of pear seedlings when they are three or four inches high, to cause the growth of fibrous roots—just as we pinch off the terminal bud of the yearling shoot, to produce lateral branches. When taken from the seed-bed, the plants, instead of the single tap-root, ten or twelve inches long, will have three or four roots from four to eight inches in length. These roots are shortened, and the plants set in the nursery rows, when a mass of fibrous roots will be produced. If the trees remain in the nursery for more than two years, the roots are again shortened.

A healthy pear tree, three or four years old, twice transplanted, is worth fifty per cent more than one of the same age, though of much greater size, remaining where it was budded. When the trees are lifted in the nursery, observe whether the roots are fibrous, and numerous; and if they are not, but consist of long, naked roots, or of two or three straight forks, their chances of successful transplanting are very small.

CAUSES OF THE FAILURE OF NURSERY TREES.

The various causes of the failure of trees obtained from nurseries would require almost a lifetime to investigate, and a volume for their enumeration. A few that have fallen under our observation will be simply narrated, without discussion.

1. The too great crowding of the trees in the nursery rows, by which a fair supply of roots cannot be obtained.

2. The trees are dug with too little care, and sent away with mangled and shortened roots.

3. Purchasers are not always sufficiently liberal to be willing to pay for the best trees, or for matting and packing them.

4. The trees may be too old, or have stood too long without transplanting.

5. Bad pruning.

6. The practice of grafting on old stocks, to which the new wood has not the power of assimilating.

7. The practice of gathering seeds for stocks from any and every source, from diseased fruit, and from the fruit of diseased trees; while the seed of small and wild pears only are fit for the purpose.

8. The custom of using suckers from old pear-tree roots, which seldom attain a fair size or thrifty growth.

9. The employment of the common and the Portugal Quinces for stock, instead of the large and rapidly growing Angers variety.

PROPER AGE FOR PLANTING.

This will depend much on the growth and treatment in the nursery. I am decidedly of the opinion, that when pear trees are to be left to struggle with the ordinary difficulties in an orchard, even when they are to have skillful attention and watchful care, they should not be planted less than four years old. This requirement, however, is not without exceptions. For instance: when they are to be planted not farther apart than twelve or fifteen feet, and have some of the advantages of good nursery treatment—in this case, even yearlings may be planted at once in the fruit ground; also, when they are to be planted at greater distances, and the grower will not begrudge the bestowment of so large a piece of ground to the cultivation of such small trees. The disadvantages of planting small trees are, that they are liable to be injured by the plow, and browsed by cattle, accidentally or intentionally admitted, or by the animals used in tillage. Perhaps the most formidable objection is, that the owner will regret what he deems the waste of a valuable piece of ground for so many years; and against his own judgment sow or plant an injurious crop among his trees.

There is, however, a much better method of treating young trees, than to subject them to the chance of all these evils. If they have not been transplanted or root-pruned, select those of two or three years' growth, and prepare a piece of ground for the home nursery. For this a rich, deep, dry soil should be spaded and thoroughly pulverized, to the depth of two feet. In it plant the trees in rows four feet distant, and three feet apart in the rows. Two hundred trees would here occupy a space fifty feet square. The roots having been carefully examined, and, as before mentioned, the laterals pruned to six or eight inches, are spread out horizontally, and gently covered with earth. It will be seen that the labor of pinching, pruning, and cultivating, will be much less on so small a spot, than when the cultivator is obliged to travel over the three or four acres, upon which they are ultimately to be planted.

If at the end of two years it is still desirable to allow them to remain, a sharp spade should be thrust down around them, at a distance of fifteen or eighteen inches, in order to cut the long straggling roots, and thus induce the formation of roots nearer home. This will fit them for transplanting at an advanced stage of growth. In this case, if at the end of two or three years they are removed at the proper season, and with care, they will suffer scarcely any check. By pursuing this plan they receive better care, grow faster, and are not liable to damage; and as only good trees will in this case be set in the fruit grounds, none of those unseemly breaks in the rows, caused by the death or injury of a tree, need occur.

Where, however, older trees, at least once transplanted, can not be obtained, and it is desirable to set out the orchard at once, stout two-year-old trees are decidedly preferable. Such trees have not stood sufficiently long to send their roots beyond a limit, whence they can be removed; and with careful digging, removal, and planting, the purchaser need not fear a loss of more than two per cent. Quince-rooted trees can be removed at any age. When over ten years old, and twelve to fifteen feet high, they can be transplanted with as much safety as pear trees, grown on pear roots, at two years of age. Captain Richardson, of Brooklyn, who sailed the "Duchess d'Orleans," a Havre packet, for many years, was induced by a French gentleman at that port to bring home in his vessel some large pear trees, grown on quince roots.

These trees were nearly twenty feet high, with a main stem six or eight inches thick at the base, branched close to the ground, and each as perfectly conical as a Norway Spruce. They had been in bearing in France for nearly twenty years; and are now, after thirteen years of growth in a new soil, beautiful objects in shape and foliage; and what is more, produce every year large crops of splendid fruit. Of the six thus brought three thousand miles, five are still living.

Persons planting large pear trees will, without doubt, obtain many advantages which they could not expect from smaller ones; yet these are entirely conditional upon the treatment the trees have previously received.

To repeat, pear trees upon quince roots, of ten or twelve years of age, may be removed with almost perfect certainty of success. But to insure safety with trees upon pear stocks, whose branches have not been shortened-in, they should be either pyramids or half standards, so that fibrous roots will have formed near the stem; or they must have been root-pruned, or transplanted in the nursery. But in the case of standards, whose growth has been unchecked, roots as long and numerous as the branches will have formed—which, of course cannot be retained in transplanting. Such trees can only be safely transplanted when root-pruned the previous year, by digging a trench around each, and cutting off all the roots which extend into the trench. These trenches should be filled with good soil, to induce the formation of fibrous roots.

After much experience in planting large trees, I am convinced that the pear is the only species of fruit-tree capable of being readily transplanted at a large size; and that when the foregoing directions are complied with, the pear culturist may obtain an advance in the fruiting of his orchard of five or six years.

Instances of success in the planting and fruiting of large trees are numerous. In the spring of 1856, Mr. L. PECK, of New Haven, removed to his garden a Flemish Beauty, twelve years old, which, in the fall of 1857, bore a bushel of pears that averaged larger than Duchesse d'Angoulême, grown on the same grounds.

A large number of trees of equal size, planted at the same time, proved nearly as successful. Mr. Wm. HOWE, of North Salem, Westchester Co., planted a few years since, some large trees from the pear ground of Mr. Samuel Parsons, mentioned by Mr. Barry in his "Fruit Garden," and in two years obtained from it then the finest Vicar and Easter Beurré Pears exhibited at the Fair of the American Institute for that year.

SEASON FOR REMOVING AND PLANTING TREES.

Our country possesses such a varied soil and climate that no general rule can be given for the time of planting; indeed, the exact period must differ with almost every season. The removal of trees should take place while the vital powers are dormant, or nearly so. This is indicated by the ripening, and ultimately by the fall of the leaf, which occurs, in the latitude of New York City, from the middle of September until the first of November. From the period at which the leaves ripen until they form again in April or May, trees may be removed with safety whenever the state of the weather will permit, and the soil is sufficiently free from frost for their reception. Large numbers of trees are removed from nurseries, and planted with success, immediately after the leaves have been killed by early frost—such as remain on the tree having been stripped off.

The fibrous-rooted quince and root-pruned pear trees are liable to be thrown out by the freezings and thawings of winter, if they are not planted sufficiently early to allow the settling of the soil about the roots before the ground freezes. When planted in autumn the trees should receive a heap of earth about their trunk and over the roots. If the trees to be planted can be obtained at a period in the fall when one may reasonably expect fine weather and warm rains to assist in settling the earth, before it is frozen, the hurry and uncertainty of a late spring should be avoided by autumn planting. The season best adapted to the transplanting of the Pear is, that short period before the commencement of severe frosts when the leaves and wood are perfectly ripened, and the former easily parts from the tree. At this period, the great flow of sap to the leaves has ceased, and every cut and bruised rootlet will receive a covering of healing tissue, through which, within a few days, rootlets will push out.

During the fall and spring, when the ground is not frozen, these radicles are increasing, and are ready to commence their office when the first leaves begin to put forth. Not only do the wounded roots send forth fibres, but twigs of the pear-wood which have been properly layered in late summer will be well provided with spongioles. Trees removed in early autumn, with care, will scarcely show any check, and will often fruit as well the first season after planting as if they had not been disturbed.

Trees received from France, which have been dug when wood and leaf were fully ripened, will, on their arrival here, exhibit on their pruned roots, and even on their broken branches, a thick coating of newly-formed tissue, and often many rootlets, an inch or more in length. The most skillful English nurserymen and fruit cultivators select early autumn for the removal of their trees.

If trees arrive in early spring, one should not hasten the planting so much as to be obliged to perform the work indifferently, by planting in shallow holes or poorly prepared soil. Lay the trees in by the heels, covering the roots deeply with loose, fine earth, and then plant them at leisure, removing them from the trench no faster than they are required. By occasionally moving the trees heeled-in, the period of planting may be delayed until the middle of May. It must not be forgotten, that the leaves should be fully ripe, and all growth completed, else the evaporation of sap through the still active leaves would go on too rapidly for the supply afforded by the maimed roots.

ROOTS OF THE PEAR.

As the Pear tree advances in age, the difficulty of successful removal increases. The reason is not always understood by those who seem to consider the roots as chiefly valuable for sustaining the tree in an upright position, and obtain with the tree the least number that will perform this office. Almost all persons believe that if, by dint of extra labor, they have secured a few long, naked canes of roots, that they have performed their work admirably; although by careless digging, or pulling the roots through the soil, they may have destroyed all the hair-like fibres which alone give value to the main roots. The nourishment of trees is received from the soil, through the agency of the hair-like rootlets which spread through it from the termini of the larger root. No matter how many large roots may be attached to the lifted tree, its removal will only be well performed when you have secured a large quantity of fibrous roots.

As the tree increases in size, the roots near the body exhaust the soil of nutriment, and the absorbents, or fibrous spongioles, become hardened by age, and incapable of action. New fibres push out from the termini of the rootlets into the newer and richer soil, and the office of those in the exhausted ground is at an end. Nature supports no useless members in her economy, and those radicles which have performed their office, and become incapable of affording further aid, are cast off.

Thus, year after year, as the roots extend and throw off their fibres, the new spongioles supplied are found farther and farther from the trunk, and more and more labor must be expended in the digging, to obtain a sufficient number of them to sustain the tree in its new position.

No one need expect a tree to flourish, or indeed do more than barely survive transplanting, who is careless about the kind of roots with which his trees are supplied.

PRUNING AND ROOT-PRUNING BEFORE PLANTING.

Although the Pear tree will endure more severe pruning, and yield more readily to modifications of its form, than other fruit-trees, yet this facility of management may cause us to lose sight of the fact, that the restraint of its irregular growth can be better performed in its succulent condition by summer pinching. But as the form of nursery trees is usually very imperfect, and will require severe pruning to reduce it to regularity, we should perform this labor in

Fig. 29.

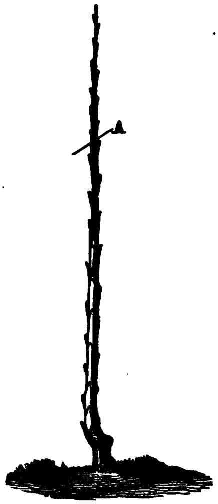


Fig. 30.

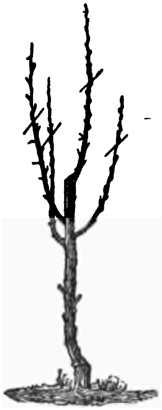
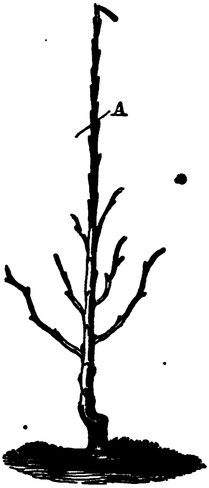


Fig. 31.



such a manner as to need no repetition, and so that only the gentler restraints of summer pinching, and the pruning of young shoots, will be needed, to induce a handsome shape. The great difference between the effects of two methods of pruning may be seen by reference to the figures. Fig. 30 represents a maiden plant or tree of one year's growth from the bud, with a mark at A, to indicate the place at which it is frequently shortened in the fall pruning.

It should have been shortened in at about half its height. The cross lines on Fig. 31 indicate places on the limbs where the usual improper pruning would be performed. Both of these Figures exhibit incorrect modes of shortening, which will induce a growth that becomes very difficult to shape into regularity. To form a pyramid of the tree shown at Fig. 30, its branches should be shortened to two or three buds, and the young shoots formed from these, pinched during the latter part of June, to induce the lower dormant buds to push out. But the method most certain of producing the basis for a well-shaped pyramid is the summer pinching of the maiden plant, as shown at Fig. 31, which is the form that the tree at Fig. 29 would have assumed in autumn, if pinched during the preceding July. This last-mentioned tree will now need to be shortened-in much below the mark at A, to induce lateral shoots in the proper place to form a well-balanced pyramid. No general rule for pruning trees before planting would accurately meet the necessities of each case, but it will be safe to recommend, that when branches or branch spurs have not formed low down upon the stem, or when the tree is not stocky and vigorous, or when the roots are much shortened in digging, the tree should be cut back one-half of its height. No one who prizes ultimate excellence more than the present appearance of his trees, but will prune mercilessly all the parts that conflict with their perfection of shape. In most instances, trees are retarded for two or three years by permitting too large a quantity of foliage to remain. Too many branches are demanding a mere subsistence, when a fewer number would find nutriment enough to insure a vigorous growth.

When the pyramidal form is not desired, it is still necessary to preserve the balance between the roots and the top of the tree.

Most horticulturists have stopped here in their instructions relating to planting; but root-pruning will be found fully as important in practice as the proper shaping of the top. Wounded roots must not only be removed, and the ends of all the cut or broken ones smoothly pared, but, in many cases, all the roots may be shortened with profit in the growth and fruiting of the tree. When large mass s of fibrous roots are formed, as on the quince and root-pruned pear stocks, they become so matted together as not easily to be separated from each other by earth in planting. When roots are placed in contact in the soil, they will usually become diseased, and lose their power of affording sustenance to the tree.

Before the tree is planted, the fibres and succulent spongioles should be shortened to an inch in length, and thinned sufficiently to admit of being readily separated by the earth distributed among them.

It is now the received practice among horticulturists to plant the pear or quince root so deep as to cover the place where the pear-bud was inserted. By this method, as the quince stock has been budded at least four inches above the ground, we add six inches to the depth of the root, plunging into a colder soil those rootlets which have been formed near the surface, and are not adapted to that depth, and thus violating some of the delicate conditions of vegetable life.

In replanting trees on quince stocks so deep as to cover a portion of the pear, it is best to prune off two or three inches of the main root. The recent removal of some hundred trees, which had been planted out three or four years, gave me an opportunity of examining the effect of deep planting. In almost every instance where the quince-roots had been buried six or eight inches deeper than the natural position, I found the lower layer of roots inert, and in many cases diseased, and it has now become my practice to remove three or four inches of the lower portion of the main root with a fine saw. For trees upon the quince stock, no fears need be entertained on account of the reduction of the roots, as the portion of the stock buried will soon be covered with fibres and rootlets.

After having been once root-pruned and planted out, trees may be removed within three years from their root-pruning, without greatly reducing their tops. Ordinary nursery trees must be severely pruned in their branches, in order to reduce the evaporating surface of wood and leaves to a limit that will require no more sap than the roots are able to furnish. Suppose a tree capable of evaporating two gallons of sap each day, through its leaves, is provided with roots sufficient to furnish this amount. Now, if the tree be removed, and nearly half the roots are mutilated and lost, while all the branches and leaves are left entire, it is plainly to be seen that the latter will continue to require a full supply of sap, while the diminished roots will be incapable of supplying sufficient moisture to prevent the tree from drying. It must be distinctly kept in mind that the formation of roots is in almost exact ratio to the amount of healthy branches and foliage, and that every branch has its counterpart of root below the surface of the soil.

REPLANTING THE PEAR TO FORM FIBROUS ROOTS.

Some of the English, and other foreign nurserymen have a scale of prices for trees of the same variety, graduated by the number of transplantings.

The tree is lifted at the end of the second year, the roots smoothly trimmed, and replanted immediately in an adjoining trench. As each successive row is removed, the ground which was occupied by it is opened for the reception of the next. The benefits derived from this process consist in the formation of large numbers of fibrous roots, which push out at the extremities of the pruned roots, and the consequent safety of removal. Two or three transplantings of the Pear tree will produce a mass of rootlets and spongioles that somewhat resembles an enormous head of hair. The transplantings occurring at intervals of two or three years, will occasion at each removal more and more surprise at the immense mass of roots, and the great change which will have taken place in their character. Instead of long straggling laterals, stretching away from the trunk for several yards, masses of innumerable fibres will be found, contained within a compass of three or four feet, and instead of the feeble shoots that are usually produced after removal, the same season will often exhibit a vigorous growth, and ripened fruit.

HEELING-IN.

When trees arrive at an inconvenient time for their permanent planting, they should be immediately heeled-in. A trench should be dug nearly a foot deep, taking care to throw all the earth upon one side, to form a bank sloping to the bottom of the ditch. In this trench place the roots of the trees close together, permitting their bodies to recline against the bank; then sprinkle the earth upon the roots as in planting, taking care to leave no spaces for mice to harbor in, or which will expose the roots to frost, or the drying influence of the atmosphere. If the trees are to remain any length of time, and particularly through the winter, this is a labor that must not be slighted, and the trees should receive nearly as much care as in permanent planting.

When slightly inclined, the trees are more readily covered, and can be removed with less injury to their roots. If the trees in this position should commence growing before it is convenient to plant them, the growth may immediately be checked by lifting them sufficiently to detach the soft spongioles forming.

TREATMENT OF WITHERED TREES.

When the roots of trees that arrive from the nursery appear dry, if the branches are not withered, it will be sufficient to plunge them for an hour into a thin mortar of clay or earth; but when the trunk and branches present a shrunken and withered appearance, they should be at once laid at length in a shallow trench, covered lightly with earth, and left from three to ten days, according to their condition, until the bark is swollen full and plump. The wood of plants is not a solid structure, but is composed of cells or short tubes, separated by woody fibre. These cells are the arteries and veins of the plant, in which is conveyed the sap which hardens into wood and bark, or is developed into fruit and leaf.

When the tree has become dry, these cells contract so much that sap cannot pass through them, and artificial means, such as are above described, become necessary to restore their functions. Trees which it is necessary to treat in this manner should be shortened in to a greater extent than is needful in other cases, and when planted, the ground should be well mulched. Frequent sprinkling and watering of the branches and foliage of injured and poorly rooted trees is found much more useful than the profuse pouring of water upon the roots—by preventing the evaporation through the leaves from exhausting the supply of sap.

PLANTING.

Many persons imagine it necessary to choose a wet day for planting trees. On a light sandy loam, little injury would result, perhaps, from the selection of such a day, but for planting upon a strong loam, or clayey soil, no choice could be more injudicious.

The earth falls in mortar or in clods upon the roots, pressing them down into close contact, instead of being distributed between them, and thus separating each rootlet from its fellow with intervening earth that would soon be filled with fibres.

The ground, even of a light soil, is trodden hard when wet, and is thus left in the most unfit condition for future cultivation. Contrary to the usual belief, the day selected ought not only to be dry, but at least two or three days should have elapsed after the falling of rain, before planting is commenced. The soil being now prepared, and the holes dug according to the directions given, let one person hold the tree in an upright condition, and another with a shaking motion of the shovel sift the mould among the roots, ooccasionally stopping to lift those roots that have fallen below their natural position. The necessity of attending carefully to this latter direction will be seen from the fact that the roots of trees, especially when fibrous, are thrown out in layers so as to reach different strata of earth, and that no two roots can be found growing in contact. Consequently, when the roots are pressed down in a mass, the energies of the tree must be greatly crippled, and its growth retarded. When the roots have been partially covered by shaking in the pulverized earth, the person holding the tree may, by a slight tremulous motion, sift the finer particles among the fibrous roots, and thus separate them more completely; but carefully avoiding to lift the tree so as to alter its level, or tear its roots. To prevent the formation of a hollow beneath the forked roots of a tree, a mound of firm earth should be formed in the hole upon which the tree is to be planted, and care observed to press the earth into any space that may remain.

If the tree is found to be planted too deeply, it must not be lifted, with all the weight of soil upon it, until it has reached its proper level (as this careless plan would displace all the roots, and entirely ruin the more delicate ones) but the earth should be carefully removed, and the tree reset. The hole should be filled, as far as possible, with the top soil; and to obtain a sufficiency for this purpose, the soil should be removed from the adjoining surface, and intermingled with a portion of the subsoil, to fill the hole.

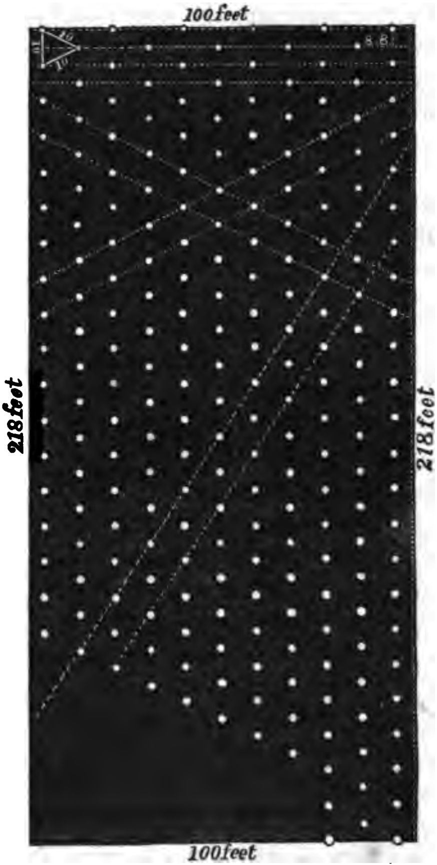
If the earth immediately around the roots of a tree is poor, the most skillful cultivator cannot remedy the defect without removal of the tree; but when an infertile soil is upon the surface, any ordinary laborer can improve it by manuring.

The loose earth with which holes are filled in planting trees, must not be pressed upon the roots by treading, or other means, under the pretext of fixing the tree firmly in its place. The more loose and porous the soil is left, in filling the hole, the more perfectly will the next rains wash it among and around the roots, and solidify the ground. If convenient, a few pails of water would imperfectly imitate the effect of rain, and prove temporarily beneficial. To prevent the displacement of the tree by heavy winds, and the consequent racking and fracture of the roots, a mound of earth should be raised against the body, to remain through the winter, and for a month or more in spring.

PLAN OF ARRANGING PEAR GROUNDS.

By training all the trees of a plantation, whether on Quince or Pear roots, as pyramids or low standards, but little care need be observed to preserve greater distances between those on Pear stocks. The best arrangement is the quincunx, as it affords a larger space to trees planted in this manner, than set opposite each other. By this plan, the trees will be arranged in rows in five different directions, from which fact the method takes its name. In planting, the ground should be laid off by a plow in furrows, at the proper distance. A furrow should then be plowed at right angles to the former, at one end of the plot, where the outside row of trees is to be planted, as in Fig. 32. The distance at which the next parallel furrow is to be plowed, should be one half of that at which the trees are to be planted in the rows. That is, if the rows are ten feet from each other, and the trees are t

Fig. 32.



be planted at ten feet apart in the rows, the cross furrows must be plowed five feet distant from each other.

Every alternate crossing will indicate the position of a tree, omitting the first crossing in each alternate row. If the trees are planted quite up to the boundary line, this plan would give us five rows of twenty-two, and six rows of twenty-three trees each, or an aggregate of 248 trees upon a plot of the size as shown at Fig. 32, which represents half an acre of ground—although the addition to one side of this of an equal plot of ground would be capable of containing only 225 trees. If trained to branch near the ground, and properly pruned, 473 trees may be grown and fruited upon an acre, for many years, without crowding. By this method—improperly termed quincunx—each tree would stand ten feet from its neighbors in the same row, and a trifle over twelve feet from the nearest in the adjacent rows.

The true quincunx arrangement is formed by placing the trees at equal distances from each other in every direction, and when the distance proposed is ten feet, it will be necessary that the rows should be laid out at eight feet eight inches apart, and the trees planted ten feet apart in the rows, as represented in Fig. 32. By this arrangement, each tree occupies the centre of a hexagon of equal sides, and is consequently equidistant from all the adjacent trees—exactly ten feet separating each tree in the plot from its neighbors. By this method, 563 trees may be planted on an acre, as we gain space for three additional rows.

For a pear garden, I have found ten feet to be an ample distance; and for planting an acre, would recommend that the eleven trees at each end of the plot, and one entire row of twenty-three trees, should be omitted in planting, and that the space occupied by the row be divided on each side of the plot, so as to leave a clear unoccupied space of five feet around it. Five hundred trees will thus find ample room upon an acre; and may yield their fruit to one generation before they will give evidence of being crowded.

A plan very frequently adopted is, the planting in borders on either side of a path and around garden squares. The borders should be deeply tilled and rich, and the trees may be planted quite closely.

A beautiful effect may be produced by preparing, on each side of a path, a border of not less than twenty-five feet wide, in which are to be planted fruit-trees, in a form to produce the effect of the sides of an amphitheatre. In the side of the border furthest from the path, are to be planted the most vigorous varieties of pear trees, on their own roots. Next, and at a distance of not more six feet, should be planted a row of less thrifty kinds, on quince roots. Each succeeding row should be composed of varieties less vigorous in their growth than the preceding, until the front row is reached, which should be planted with dwarf apples.

The outside row may be planted with the Vicar of Winkfield and St. Michael Archange—the second with Bartlett on pear, and Urbaniste on quince stocks, the third with Duchesse and Louise Bonne de Jersey on quince, and the fourth with Flemish Beauty and Winter Nelis on quince.

DEPTH OF PLANTING.

No part of fruit culture has attracted more attention, and elicited more speculation, than this. In one point all are agreed, that, with few exceptions, fruit-trees should never be planted deeper than they grew in the nursery. The part of the tree called the collar, where the bark of the roots meets that of the trunk, the natural position of which is a little below the surface of the ground, marks the limit to which it should be usually buried. Although the earth may be temporarily heaped higher than this, around a tree just planted, yet it should generally be removed soon after growth commences.

A Mr. Comstock created some sensation, not long since, by his claim to have discovered the grand secret of successful fruit culture. He acquired some money, and a sort of fame, by lectures upon what he termed the science of Terra-culture—or, cultivation without disturbing the rootlets which fill the soil. His theory was, that a tree planted below its natural depth threw out a new stratum of roots, by which the equilibrium was lost, and it became thenceforth a maimed tree, incapable of producing its maximum of fruit. But his theory was only a repetition of the old story of human error—a part taken for the whole.

In planting in a dry and deeply pulverized soil, the pear tree may with safety be placed lower than its original position. According to my own experience, it is quite essential to success, after removing a pear tree from a heavy to a light soil, that it be planted one or two inches deeper than originally grown.

But in wet or compact soils, or on those composed in great part of organic matter, like the Western prairies, a preferable plan is, to ridge up the soil six or eight inches high, by backfurrowing, and in the embankment plant the trees. Some persons have practiced with success, on wet or clay soils, a plan of planting on the surface of the ground, and covering the roots, by heaping up a mound of earth much wider than the space occupied by them. This may serve temporarily; but the plan is a mere shift to escape the labor and expense of draining, and permanently improving the soil.

But to the rule generally established for the depth of planting, there are two notable exceptions. First, while the Peach, Cherry, Plum, and Apple, cannot be planted much lower than the collar without injury, the Quince, the Grape, and the Pear on quince roots, are, from the structure of their bark and wood, capable of adapting themselves to a depth of planting much lower. Second, when the soils have been deeply trenched or subsoiled, their level is much higher than in their former state, and in compacting, they will sink away from the roots planted in them, leaving the upper ones exposed, unless the trees should be planted deeper than grown in the nursery. Very fibrous-rooted trees obtain a better hold of the soil, and are carried down with it. In planting grounds deeply prepared with pear trees, I have found those on the quince stock, by their fibrous roots, able to maintain their relative position in the soil, while in its compacting, the trees on pear stock alternating with the others, would be left two or three inches out of the ground.

CULTIVATION OF THE PEAR ORCHARD.

A reputation for bad management, and perhaps a residence in a lunatic asylum, could not be more readily obtained by a farmer, than to persistently practice the growing of weeds and grass in his potato and corn-fields, seeding down to grass the garden which he had just planted with vegetables, or turning his cattle to graze in his ripening grain.

Yet, scarcely one in a hundred farmers but performs every one of these insane practices upon his orchard and fruit grounds. Until within a very few years, the orchard was quite as much relied upon for pasturage and grain crops as the meadow and fallow. Hundreds of thousands of trees have been planted in ground cropped year after year with corn or wheat, that have made no more growth in five years than might have been produced in two. Nothing could be less economical, even where only profit was desired. No reason can be given why a field of corn and potatoes should be cultivated with plow and hoe, that is not an equally powerful argument in favor of the same treatment of young trees; and there are many reasons why the latter will not succeed with grass and grain, when they would grow luxuriantly with root crops. One of the principal arguments in favor of the latter practice may suggest others to thinking observers. Vegetables grown for their roots derive the far greater portion of their nutriment from the atmosphere, through their broad or luxuriant foliage, while grasses and grains take more largely from the soil. The latter plants not only permeate the soil more completely with their roots, but by their taller and denser growth, prevent that free contact of the lower branches and leaves with the atmosphere necessary for the absorption of nutritious gases, and the deposit of invigorating dews.

The experience of the best horticulturists confirms the opinion that the cultivation of the ground, equal to that usually bestowed upon corn and potatoes, coupled with the avoidance of any grain crop, will hasten the maturity and fruiting of the Pear, from six to ten years. If the ground is root-cropped, the cultivation for the roots will afford an excellent tillage for the trees, which, for a few years, will but little interfere with the growth of the former. The plowing must be managed with some skill to avoid wounding the trunk with the whiffletree, or cutting and exposing the roots with the share, and the distance of plow cultivation from the tree should be increased each year, to avoid injury to the growing roots. On this account, the surface near the tree should not be disturbed more than two or three inches deep, after the latter has acquired considerable size, and this operation should be performed with a digging-fork. Almost every cultivator of trees has observed striking instances of the difference in their growth, when cultivated or neglected; but the narrative of one may not be inappropriate. A few years since, a gentleman, having planted a considerable number of pear and other fruit-trees, devoted a portion of the ground occupied by them to his vegetable garden, while the remainder was retained as a lawn. The trees growing in the trenched and cultivated garden are handsome pyramids, ten feet high, and in bearing, while those in the lawn, although with a space of two feet around them cleared from grass, have not perceptibly increased for six years.

MULCHING.

No process will more essentially aid in sustaining the life of a tree, enabling it to resist the rude shock of being torn from its native soil, and inducing vigorous growth, than mulching, or covering the soil with any waste or half-decayed vegetable material. The half-rotted straw of the bottoms of stacks, leaves gathered from the woods, the refuse clippings and tan-bark from leather factories, are all of value for this purpose. Covering the ground with these, three or four inches deep, around the newly-planted trees, has the effect of preserving a moist condition of the soil, and an even temperature during the great heat of summer. A most important element in the growth of plants is this preservation of an equable temperature, as may be seen in a cold vinery, where the range of the thermometer scarcely varies ten degrees during day and night. The mulching also protects the ground from excessive evaporation; so that, during long periods of drought, the ground remains uniformly moist and light. To the Pear this treatment is peculiarly grateful, for there are few plants in which respiration goes on so rapidly, and which require such constant supplies of moisture. A curious and instructive experiment is narrated. A pear tree was grown in a large tub until it had obtained a vigorous condition, and when the soil was in a comparatively low state of humidity, the weight of the vessel with its earth and tree was ascertained.

In a warm July day, a given weight of water was supplied, and the earth protected from surface evaporation by a cover. In forty hours, the whole was again weighed, when it was found that seven gallons of water had been thrown off by the leaves of the tree, or more than twice its own weight.

Prof. Mapes narrates an experiment which he performed upon a pyramidal pear tree three years planted, and seven feet high. A hole was dug beneath one of the largest roots, which remaining attached to the tree, and with all its spongioles as nearly entire as possible, was placed in a pail of water, and the whole carefully covered with a blanket. In twenty-four hours the tree was found to have appropriated nearly two gallons of the water. No small benefit derived from mulching, is owing to the fact that trees so treated need no watering; and the excuse for the barbarous practice of frequently drenching their delicate rootlets with cold water is removed. Poorly-rooted trees, or such as have been exposed before planting, or are quite withered and dry, or indeed all plants which survive transplanting with much difficulty, can in many instances be saved by mulching deeply for five or six feet about the tree. The loose texture of the mulch does not prevent atmospheric contact with the soil, and being constantly damp, both the mulch and the earth absorb ammonia and carbonic acid vapor. Some varieties of pear of great excellence, which crack badly, may be ripened in perfection by mulching, as the cracking is in some degree due to an insufficient supply of sap. The mulch not only acts as an absorbent of fertilizing gases, but in time becomes itself a valuable manure.

There are, however, some counterbalancing disadvantages in mulching, which will confine its practice to the single season of planting. The immense increase of insects, which will propagate in its shelter—the ravages of mice that find beneath it security from pursuit—and the late growth of shoots which it induces, liable to winter-blight, are some of the effects of its continuance.

After much experiment, I am convinced that the best mulch for any other than newly-planted trees is a soil often stirred with the dew upon it.

CROPPING THE GROUND FOR A MULCH.

A very convenient substitute for litter, and one from which none of the evils noted will result, is an early crop of some of the broad-leaved vegetables. Turnips, beets, and potatoes, are valuable in the order they are mentioned for this purpose, and would in most cases repay the labor of cultivating the trees on them. The first two have the additional advantage of penetrating and loosening the soil without bruising the roots of the trees; and by the superior coolness of their leaves to the night-air, condense the humidity in currents of atmosphere passing over them, in the shape of dew, which would have fallen upon the plowed field or the dusty road; and thus assist in nourishing the feebler foliage of the newly-planted trees. Notwithstanding all these devices for preserving moisture in the earth, the golden rule of agriculture should be remembered. Soils disturbed when dry, or during the heat of the day, loose their moisture; but plowed or hoed in early morning, more moisture is acquired.

SPECIAL MANURES FOR THE PEARS AFTER PLANTING.

That a Flemish Beauty or a Napoleon will be produced in perfection in one soil, while, a mile distant, and in one of precisely similar appearance, they fail to be anything more than second rate, is a mystery that has hitherto mocked our investigation. It is unfortunate that nostrums, based upon some degree of knowledge of the necessities of the case, have been palmed off upon the community, deterring many persons from further investigation; still, when we recollect what science has done for human development, it may reasonably be expected to perform much for vegetation.

If it is remembered, *that it is a great thing in an experiment to have Nature upon one's side*, the analysis of the Pear will suggest the course our investigation should take.

It is not unfrequent that trees exhibiting every quality requisite for fruiting fail for many years to produce a single pear, when the application of a bushel of lime, a dressing of wood-ashes, a small quantity of bone-meal, or of iron filings, or refuse sand from the foundry, has brought them into immediate fruitfulness. I have seen some very surprising effects of some of these materials, in the vigorous growth and fruiting of trees hitherto barren. It should be understood, that a tree can no more grow, and produce fruit, *when one of its elements is lacking*, though all the others are present, than a house can be built, when all its materials, except the nails, have been obtained.

Mr. Downing was of the opinion, that bones finely ground and mixed with wood-ashes, would prevent the leaf-rust; and several nurserymen who have used the compost seem to adopt the same belief.

Mr. Barry very tersely and happily remarks: "Bone-dust, blacksmiths' cinders, muck-lime, wood-ashes, and half a dozen other things, have been recommended to be compounded, in pecks and half-pecks, all with a view to remedy the rust, or leaf-blight, that no man can say originates in any defect of the soil." But the failure of specific manures to produce certain results, for which no rationale founded in natural science could be given, ought not to deter us from investigation in a philosophical manner. Some simple facts illustrative of the value of scientific knowledge in the management of the Pear may be stated. On a plot of rich ground, where blight had year after year affected the Pear, its farther ravages were prevented by a large application of lime; this was accounted for by the destructive action of the lime upon the excessive organic matter of the soil, thus inducing a more stocky and well ripened growth. Dr. N. R. Teft, of Onondaga, so changed the appearance, in shape and size, of the fruit borne on a Virgalieu pear tree by a very large application of leached ashes, that specimens of it received the premium from the American Institute as the best new table-pear.

Some remarkably fine Bartletts, and handsome specimens of other varieties, having attracted attention, they were found to have been raised by a blacksmith of Newtown, Long Island, from trees that received the refuse of his forge.

At the Exhibition of the Massachusetts Horticultural Society, 1857, which was pronounced by Europeans superior in its show of pears to any which could be made in Europe, the collection of Mr. Bacon was awarded the highest premium for the ten best varieties. These pears, the most beautiful in color, regular in shape, and the largest in size of their respective varieties, were grown over a salt marsh which had been filled three or four feet. I ascertained, on inquiry, that several other gardens, which occupied similar positions, were remarkable for the fine pears grown upon them. The Napoleon, Soldat Laboureur, and other new varieties, that have generally proved but second-rate, have been produced of the very highest quality, when the trees had been liberally treated to superphosphate of lime.

Dr. Lindley, author of a treatise on "Vegetable Physiology," and a nurseryman of great experience in England, strongly recommends the use of superphosphate of lime for newly-planted trees, as it excites the rapid formation of fibrous roots, and thus provides for supplying the great waste of fluids, which is carried on with such rapidity from the leaves and branches.

These facts, even if they teach us nothing positive, certainly indicate the direction in which our investigations should be pursued.

INVIGORATING OLD TREES.

The cause of the want of vigor, slow growth, and some or entire cessation of increase in pear trees of considerable size, is generally the exhaustion of the soil within the range of their roots; the whole energy of the trees being devoted to sustaining the fruit buds and spurs, no wood growth can be made while this exhaustive fruit production proceeds. There is also an entire suspension of the absorptive and perspiratory functions of the bark caused by the incrustation of dead bark, moss, and fungi that cover the tree. The aged roots have lost their radicles, and do not possess the power to push out spongioles into new and unexhausted soil.

These conditions suggest at once the remedy. A trench should be dug around the tree, at about as many feet distant from it as there are inches in the diameter of the trunk, though rarely farther than six or eight feet. This trench should be at least two or three feet wide, and as deep as the roots penetrate, the latter being pruned off with a smooth cut. The sods around the trees should be pared off to the depth of four or five inches, and mixed with manure to fill the trench, and a good generous compost of new earth and barnyard manure should be put around the tree in place of the sods removed. The old and feeble branches having only fruit spurs, should be shortened in such a manner as to form a handsome top. The rough fungus bark should be gently scraped away, care being taken not to expose the vital bark beneath. A better method is to wash with strong soap-suds or potash water; the old bark will be loosened and pushed off by the new formation of bark beneath.

If the tree is of an inferior or wild variety, the smaller branches may be filled with grafts, of which a large number should be set, in order not to prune the tree too severely, and also to furnish it as soon as possible with new respiratory organs.

GRAFTING LARGE TREES.

It is a very common result of grafting large trees, that after producing an apparently vigorous growth for two or three years, they exhibit tokens of disease, and finally die.

There is little doubt that this is the result of too great an interference with the structure of the tree, by cutting away nearly all the top in a single season, for the purpose of grafting. The roots prepared by a vigorous top, with an abundance of rich condensed sap, are, in their turn, ready to offer a copious supply to the top, for elaboration, and oxygenizing by the leaves.

Thrown back or suspended in the structure of the tree by this severe pruning, the sap becomes condensed by evaporation, and remains clogging and suffocating the vital energies of the tree, which makes strenuous efforts to supply itself with the organs of respiration.

The true method of grafting trees more than five or six years old is, to remove not more than one-third to one-half of the top in one season, and set a very large number of grafts in the limbs, or to dig a trench about the tree, and thus shorten the roots to prevent too large a supply of sap.

PART IV.—THE PEAR UPON THE QUINCE STOCK.

OFFICE OF THE QUINCE.

The office of the Quince, in its association with the pear tree, does not seem to have been generally considered. It is the only one of our fruit-trees which is readily propagated from layers or cuttings. Of one thousand cuttings of other species of fruit-trees, planted in the ordinary manner, but a very few would strike root, while of the same number of the Quince, but very few would fail to grow. The portion of quince on a quince-rooted pear tree, which has hitherto served as trunk, will, if covered with soil, in a few days, throw out rootlets, and thenceforth perform the office of root to the tree it supports. It seems therefore, incredible, that with these facts in view, intelligent cultivators should have failed to provide the conditions for the Quince to fulfill its office.

By planting so deeply that the Quince is entirely beneath the ground, all the objections to its use in propagating the Pear are overcome. The principal of these objections are: *First*, that the Pear grown on the Quince is short-lived. *Second*, that the trees often break at the junction, from imperfect union. *Third*, they are always of small size. *Fourth*, that the Pear outgrows the Quince, and produces a deformity. All these difficulties have been remedied, or avoided altogether, by planting so deeply that the Quince is entirely beneath the ground, for the *office of the Quince is entirely as a root, and never as a trunk.*

CAUSES OF THE FAILURE OF THE PEAR ON THE QUINCE.

The introduction of new plants, or of novel modes of cultivating old ones, is always attended with many failures, arising from insufficient knowledge of the conditions necessary to the success of the experiments.

The value of the Quince as a stock for the Pear has been a subject of much dispute; but candid observers, aiming only at the exact truth, have settled into the conviction, that its failure for this purpose has proceeded in every instance from some neglect of the necessary conditions of its growth. The causes of failure may be summed up as follows:

First—In the heat of the first demand for pear trees upon quince stocks, many thousands of the common or Portugal Quince were used. This variety is entirely unfitted for this purpose, by its slow growth, and slight assimilation with the Pear, and the small size it attains.

Second—All the varieties of pear were at first indiscriminately grown on the Quince, without regard to their fitness. But it is now well ascertained that only a limited number of our finer pears are entirely adapted to the Quince.

Third—The office of the Quince in the double tree being wholly mistaken, it was planted as it stood in the nursery, often with the junction of the two species from three to eight inches above the soil; and in addition to this mischievous practice, the tree was not unfrequently trimmed up as a standard. This method of pruning gave the top, when large, a great lever power at the ground; and the trees, unable to resist the force of the wind, often parted at the junction of the bud with the stock. If the tree survived, it was often a monstrosity of growth, the pear swelling out to twice the diameter of the quince.

ADVANTAGES OF THE QUINCE AS A STOCK.

The conditions and advantages of the use of quince stocks, have been so fairly and clearly set forth in a communication of MR. LOUIS BERCKMANS to *The Agriculturist*, that I shall insert it here. MR. BERCKMANS has devoted a life of great activity and intelligence to experiments upon the Pear—enjoying the personal acquaintance of those gentlemen, both in Europe and America, whose names will always be associated with its culture. His collection is large, and embraces selections from the best seedlings of VAN MONS, ESPERIN, BIVORT, and others. His great experience entitles his testimony to the highest consideration.

In answer to the vexed question—Will pears budded on the Quince succeed?—MR. BERCKMANS says: "I have no hesitation in saying: 'Yes, they will;' and often better than on pear stocks, *and they are less subject to blight*. I know that I do not agree with the opinions of my late friends VAN MONS and ESPERIN, who never would admit a quince stock in their experimental gardens. I respect their memory, but cannot help considering their opinion as a prejudice. They had not found the good quince stock, and, perhaps, did not know how to plant quince-grafted trees. Unless the *proper* quince stock be used, no good result need be expected. I have seen some singular mistakes in publications, for want of proper attention paid to the question, *whether trees had been budded upon the Angers, or upon the indigenous quince*, the latter being very inferior, if not worthless. The quince stock for nurseries is produced from the twigs or branches heeled or laid in before winter, and planted early in the spring. This operation succeeds better in damp and cool climates, and in sandy soils, than in this part of the United States. Therefore, most of those plants are imported (chiefly from France), although they can be produced here, with proper care, in soils fitted for them.

" At present, my best trees are on the Quince; and my best fruit also. Those who would successfully cultivate the dwarfs must pay attention to the following rules:

" 1. Have a good, substantial, rather deep soil, with porous or drained subsoil.

2. Select the good Angers or Orleans Quince for stock.

" 3. Plant no other varieties than those which succeed on the Quince.

" 4. Plant the trees deep enough, so that the place where they have been budded shall be at least three inches below the surface of the soil. In rolling ground, cover with stones, or damp mould, so as to prevent the washing away of the light soil.

" 5. Keep the weeds down.

"6. Keep the branches low, and make a pyramidal tree, by judicious pruning once or twice a year. A tree with a heavy, high top, must not be upon the Quince. Levels or gentle slopes are better than hills or rolling ground.

"It is a fortunate circumstance that most of the best market varieties are also best suited to the quince stock. Very often the grafted tree, when placed in silicious (sandy) soil or loam, forms its own roots just where it has been budded; and then, with the steadiness of the pear stock, it retains the fertility of the Quince.

"Much has been said about the *short-living* of the quince stock. If properly planted in genial soil, which is not exhausted or impoverished by intervening field crops without a reasonable supply of manure, as most of our apple orchards are; if free from ill weeds and shrubs, and other drawbacks, the quince-grafted tree will thrive for fifty years or more. Some actual facts will prove what I state. Hon. M. P. WILDER has in his garden, in Dorchester, trees which he bought from the widow of Mr. PARMENTIER, Long Island, some twenty years ago. They have yielded fine crops almost every year. Some have been regrafted with new varieties; one of them with Beurré Clairgeau, which bore this year between one and two bushels of the finest and largest pears. These trees look healthy, despite all their mutilations, and there is no reason to anticipate a diminution of growth or crops. These trees are *on the Quince*, but they have been planted by a man who knows how to manage trees.

"In the same garden are some fine Urbaniste trees—a part on the Pear, and a part on the Quince—planted in the same spot, in the same year. Those on the pear roots are now beginning to bear fruit sparingly, while the others, on quince, have yielded bushels of fruit for the last seven years, and are actually loaded with a splendid crop. All are equally healthy; but, those on pear stocks, not having exhausted part of their vigor in the best marketable produce for years back, are rather more vigorous. By thinning the crop early, so as to make it moderate, those pyramids may be easily brought up to the full vigor of their unproductive neighbors. Now comes the important question:

"'*Will quince roots do for orchards?*'

For orchards, as we find them on most of our farms, a promenade ground for cattle, a dreary waste of ill weeds, badly cultivated and shallow soil, stagnant water, injudicious selection of varieties, and more injudicious pruning with axes or dull chopping-knives—no, sir! No fruit-tree of a refined class, no tree of any value, will do in such conditions. One half of the trouble, manure, and labor, which a poor vineyard requires in France, would make a thrifty pear orchard, and would certainly pay better.

"Let us look at some fine nurseries (schools) or orchards where specimen trees are cultivated with care, and in proper soil and localities, and facts (those stubborn) things will soon bring conviction in the place of doubts.

"Messrs. **Elwanger** & **Berry**, and others, in Rochester; Mr. **Wilder** and Mr. **Hovey**, near Boston; **Chas.**

DOWNING, in Newburg; Dr. GRANT, near Peekskill; Mr. REID, Elizabethtown, N. J.; and many others, cultivate the Pear on the quince stock with the best results. At Mr. Chas. DOWNING's, where every fruit and flower is cultivated in perfection, the surface of the ground in the dwarf orchards is covered with straw, refuse hay, &c., and no care nor cultivation is required; no weeds find their way through that carpet, renewed or supplied with new straw or brush every two or three years. Mr. DOWNING seems to be perfectly satisfied with his system, and indeed he must be.

"In conclusion, let me say, that when one expects to reap the fruit of industry, he needs to give the proper attention to it; if he expects a fruit-tree to yield crops of the most refined fruit, and to grow as a maple or a cedar in the woods, he is badly mistaken. The old saying, that "a tree must take care of itself," is nonsense, when applied to fruit-trees of improved kinds. It would do as well to plant *dahlias* or *prairie roses* in a swamp, or among thistles and briars.

"He who wants large crops of pears, indifferent in size or quality, may plant all his trees on the pear stock, in deep soil; but he has to wait from ten to fifteen years. If you want large, fine fruit, which, in fact, pays better, with less trouble and expense, select your varieties on the Quince. These will often bear the first year, and always the third or fourth from their planting. If I had thirty trees to plant, twenty should be on the Quince, the balance on pear stock.

"Some varieties will not grow upon the Quince, but even these do well *double worked*—that is, budded or grafted upon a variety worked already upon the

Quince and succeeding upon it. The French call it *intermediary grafting.*

“In planting orchards, the same care and the same digging is required for a standard as for a quince stock, but how different the result? Ask Mr. Hovey, and others around Boston, from which they derive their largest profits. They all agree that the quince root has paid the soil, the expenses, tree and all, long before a *pear stock* has shown any sign of bearing.

“Below is, according to my own and my friends' experience, a list of varieties which will do for the market, till new and as good varieties can be added. We must consider that the introduction of new varieties of fruit into the market is not an easy thing. Those named below are also the best adapted to the most of the States between thirty and forty degrees of north latitude.

“I.—Varieties of Pears which do well on the pear stock, or when double worked.

“Those marked *a* do not succeed well on quince stocks. Those marked *b* do bear as early and as well as others on the Quince. They are arranged according to their value for general cultivation, market purposes, &c:

b. Bartlett—Sept.
b. Madeleine—Aug.
a. Seckle, (sometimes does well on Quince.)
b. Beurré Clairgeau—Oct., Nov.
a. Columbia—Nov.
a. Dix—Dec.
a. Doyenne Boussock—Sept.
a. Lawrence (often good on Quince) —Nov., Dec.
a. Heathcot—Sept.
a. Onondaga—Oct.
a. Kingsessing—Sept.
a. Pratt—Sept. Oct.
— Philadelphia—Sept.
b. Buffum—Sept., Oct.

And many others. The above are all *good-looking* fruits, and of course will sell readily.

“II.—VARIETIES ADAPTED TO THE QUINCE STOCK, WHICH ALSO DO WELL ON THE PEAR STOCK.

Louise Bonne de Jersey — Sept., Oct.
Duchesse d'Angoulême—Oct., Nov.
Beurré Diel—Oct., Nov.
Vicar of Winkfield—winter.
Urbaniste—Oct. Nov.
Beurré Superfin—Oct.
Beurré Hardy (or Sterckman)—Sept.
Abbott—Sept.
Belle Epine Dumas—Dec., Jan.
Beurré d'Anjou—Oct., Nov.
Flemish Beauty—Sept.
Andrews—Sept.
Kirkland's Seckle—Sept.
Brandywine—Sept.
Steven's Genesee—Sept.
Doyenne d'Alençon—winter.
Glout Morceau—winter.”

We think nothing can be more conclusive with regard to this question than the testimony of various individuals of note in the cultivation of fruit; among whom none rank higher than Marshall P. Wilder, whose views are expressed in the following remarks, given at length: “An impression has extensively prevailed unfavorable to the cultivation of the Pear on the Quince. This has arisen principally from an improper selection of kinds, or from injudicious cultivation. There are, however, three considerations which are absolutely necessary to success, viz., a deep, rich soil, the planting of the quince stock entirely below the surface of the ground, and a systematic and scientific course of pruning, as the tree progresses in growth.

“Objections to this species of cultivation have been made from the belief that the Quince was a short-lived tree, and that the crop must necessarily be small from what are termed dwarf-trees. Such, however, has not been my experience. On the contrary, *I have pear trees on the quince root which are twenty-five years old*, and which produce annually a barrel or more of fruit each; and for aught that I can see, they are destined to survive as long as any that I possess on the pear root. These may, and probably have, in some instances, thrown out roots from the pear stock, but whether this be so, or not, instances are not rare where such trees have attained in France *the age of more than a hundred years*; and we know of a quince tree in Massachusetts which is forty years old, and which has produced ten bushels of fruit in a season.

"The Pear, when grown on the Quince, should always be trained in the pyramidal form. These may be planted much closer than when grown as standards. We have known them to succeed well where grown at the distance of six feet apart in the rows, and twelve feet between the rows. In this way Mr. RIVERS, the great English cultivator, planted 2,500 of the Louise Bonne de Jersey, and 1,500 Glout Morceau for the London market. We consider twelve feet apart, each way, a liberal distance. This would give 302 trees to the acre; and we are clearly of the opinion, that soil and selection of varieties being right, no crop whatever would be more profitable. Such a plantation, with proper care, would yield, in the fifth year, from seventy-five to one hundred bushels of fine fruit. As to profit, this will not appear as an exaggeration, when it is known that Glout Morceau pears, a variety which succeeds admirably on the Quince, have sold, during the winter, readily at one to two dollars per dozen.

"We name as varieties which succeed well on the Quince the following, and to which might be added many more:

"Louise Bonne de Jersey, Vicar of Winkfield, Duchesse d'Angoulême, Glout Morceau, Passe Colmar, Urbaniste, Belle et Bonne, Beurré d'Anjou, Beurré Diel, Easter Beurré, Beurré d'Amalis."

The following, from the same gentleman, in answer to the published skepticism of a cultivator regarding the permanency of the quince stock, effectually disposes of his objections: "I have, in my grounds, many primitive pear trees from ten to seventeen feet in height, with trunks twenty-seven inches in circumference, and branching at the base from ten to twelve feet; hundreds of these trees are from twelve to fifteen years of age—they have borne regular crops from the third or fourth year after planting, and in some instances I have gathered from the aforesaid trees, 'not five or six beautiful pears,' *only*, but from one bushel to one barrel per tree. I do further aver, that these trees were originally upon the quince stock—that some of them remain in that condition now, but that most of them have rooted from the pear stock.

"That there may be no misunderstanding of terms, let it be remembered, that when I speak of *dwarf* pear trees, a term which I did not use in the quotation cited, it is in contradistinction to those which are on the pear root; for we of Massachusetts do not allow pear trees, even those on the Quinçe, to remain *dwarfs* or 'monkeys.' No, no, Mr. STOMS, we do not only make our pear trees grow, *even on the Quince*, into beautiful, large pyramids, but we make them bear five to seven years earlier on the quince than they would on the pear stock. And, as to planting deeply, so as to allow the pear stock to root, it is no 'new thing with the intelligent Colonel,' for he has *always* practiced this system—a fact well known to his Ohio friends, and to every one who has visited his grounds.

"Mr. STOMS asks: 'Why graft on the quince stock at all?'

"*Answer:* To obtain 'early fruiting,' and the pleasure and profit of regular crops, for many years, before the trees would produce fruit on their own stock.

"Again, he inquires: 'Will the Pear, under the circumstances he (Mr. WILDER) describes, (that is, rooting from the pear stock) continue to be a *dwarf?*'

"*Answer:* No; nor do we desire that it should; for, having commenced fruiting and furnished itself with fruit-spurs, it will continue to bear, whether on the pear or quince root, or on both; and, as to 'longevity,' it is generally admitted that the more roots a tree has, the greater will be its strength, and the longer its duration of life.

"Hence we plant the tree deep enough to allow it to root from the pear stock, and thus we kept the quince stock soft and emollient, also, causing it to swell evenly with the pear, and to emit roots throughout its stem, which it will do, if kept below the surface of the soil.

"Mr. STOMS further says: 'When the friends of dwarf pear tree culture shall come forward, and, with 'bill of particulars,' show me an orchard of five hundred dwarf pear trees, that have been ten years planted, which have borne fruit *successfully* and *paid cost*, I will give up the contest.'

"I will then take him to my neighbor, AUSTIN's, the Treasurer of the Massachusetts Horticultural Society, who *has five hundred and ten pear trees.* All these are on the quince root, with the exception of one or two dozen, which are on the pear root; but as these latter have borne but little fruit, Mr. S. will not object to their being counted in the lot. These trees are from eleven to thirteen years of age. One hundred of them are *Louise Bonne de Jerseys.* These trees commenced about three years after planting, have borne regular and abundant crops ever since, and are now in a very vigorous and healthy condition. No account of the crops were kept until the year 1851, but Mr. AUSTIN has kindly furnished me with the amount of his sales since that date. The total sales, for six years, were $3,408.76. The original cost of these trees was about fifty cents each, or $250. Mr. AUSTIN is a merchant, and goes to the city every day, and the only help he has had, is the service of a man who takes care of his stables and grounds. He has, however, given them his personal attention, and good cultivation: but, I think, without further estimation of '*cost*,' we may reasonably conclude that these '*five hundred trees*' have '*borne successfully, and paid cost.*'

"We will then take a ride over to the Messrs. HOVEY, where we shall find a much larger number of *pear trees* on the *quince root.* Their beautiful avenues are lined with them, some of which are from fifteen to twenty years of age; but as it will occupy, perhaps, too much time to examine all of them, we will take one walk as an example. How delighted Mr. S. must be to see 220 pear trees, 110 on each side, loaded with their luscious fruit, only eight or nine years planted, and all independently on the quince root. The product of those trees, in 1855, was twenty barrels—in 1856, twenty-five barrels. The highest price obtained was twenty dollars per barrel, the lowest eight dollars. Then we can call on Mr. STICKNEY, and look at his '*dwarf*' pear trees. We shall see some magnificent specimens of *Urbanistes* and *Louise Bonne de Jerseys.* The crop of the latter he sold the last season at ten dollars per bushel. Then we will go to Mr. MANNING's, who has some pear trees on the Quince of very large size, being from thirty to forty years old, and which 'still live,' and produce annual crops. Then we will pursue our journey on, and call on Mr. CABOT, the President of the Massachusetts Horticultural Society, Messrs. BACON, DOWNER, RICHARDSON, JOHNSON, and others, who have splendid collections of '*dwarf*' pear trees which have been '*planted ten years.*'"

Mr. R. BUIST, of Philadelphia, one of the most candid and reliable men, has published the following on

DWARF PEARS.

"This term has led to the impression that all trees are dwarfs that are grafted on the quince stock; we do not incline to this term, from the fact that we cultivated dwarf pears before we knew of the effects of the Pear on the Quince, and also from the fact that we now have very fine *standard* trees, with stems six and seven feet clear, that are on the quince stock. The Pear, Apple, Quince, Hawthorn, and Mountain Ash, all belong to the same class and order, and will grow if grafted on each other; they do not all, however, assimilate well with each other, for we find that there are some Apples that will not grow on the Pear, and *vice versa;* there are also Pears, and not a few, that will not grow on the Quince; others that grow well, but their fruits are inferior; whilst again many are greatly improved on the Quince. We now say that the Pear, to be successful on the quince stock, must be very highly cultivated with enriching manures of almost any description, incorporated with the surface-soil, and frequently stirred during the growing season, repeating the enriching material, and thorough culture, every season. They can be planted from ten to fifteen feet apart, and will, with such treatment, give a very abundant crop, even a bushel from a tree only a few years planted. This is not, however, the only attention they require—they must have a *summer* pruning and a *winter* pruning, which you shall have in another chapter.

Again, the quince stock is a very general term; there is a vast difference in the *kind* of Quince, and it is now very strange that all the pears on the Quince, whether worked thereon the past year or ten years, are on what has recently been called to the peculiar benefit of some, the Angers Quince. Certain it is, that there is a variety aptly adapted to the vigor of the Pear, more generally known to the experienced eye by its growth as that variety; and we think it is *the* variety only that demands particular notice. The growth is clean and luxuriant, bark smooth and free, making shoots six feet high in a season, readily propagated from cuttings, and even budded the first season.

Every cutting, therefore, of that variety, should be carefully planted, on which you may grow either *dwarf* or *standards*, with this result that the sorts of Pear worked thereon will come into bearing in two or three years, and continue productive for many years, say half a century, and be more free *from blight than if on the pear stock*, which roots deep, descends into the cold ground perpendicularly, predisposes the tree to blight during summer, and if not blight, produces a redundancy of wood almost beyond practical management, and not at all adapted for gardens. Another point in favor of the quince stock I might refer to, is the certainty of its growth after being removed and conveyed to a distance, the many fibres close to the bole of the tree rendering its growth almost certain, *at least, forty-nine out of fifty*. The Pear on its own stock makes few fibres, and is more precarious in removal and carriage; this is again partially under control by frequent removals in the nursery, when the trees are young, which checks their growth of wood, produces early fruiting properties, *so that we hope to live to see dwarf fruiting pears on the pear stock* as eagerly sought for as those now on the Angers Quince—you will please make a note of this assertion."

The following from Mr. Hovey, author of "Fruits of America," will be of interest to pomologists: "The cultivation of the Pear on the Quince is of such an ancient date, and has been so long and so successfully practiced in that great pear-growing country, France, that it appears somewhat absurd to see it attacked at this late day, as it has been by individuals who, either from want of experience or other causes, have not succeeded well in its cultivation on this stock, and hence would deny to a great portion of our community, for a series of years, so delicious a fruit as the Pear; for in no way can it be obtained in any abundance, for half a generation after planting, except upon the Quince.

An intelligent correspondent has shown the fallacy of the arguments made use of to disparage the quince stock, and it would be useless to go over the ground again. As he has truly said: "Let gentlemen botanists have their own way in disputing. On we shall go, reaping an abundance of fruit while they are cavilling in regard to a fact long ago established by the experience of men, not mere tyros in the work, but those who have made the question a study for life."

RULES FOR GROWING THE PEAR ON THE QUINCE.

From these just and lucid statements of distinguished horticulturists, it is easy to learn that the requisites for successfully cultivating the Pear on the Quince are:

1. That the pear should be budded on the Angers Quince, a free-growing variety—a tree rather than a shrub, like the Portugal Quince. Several specimens of this variety, on my grounds, have grown, in two seasons, seven feet in height, and one inch and a quarter in diameter.

2. That only the right kinds of Pear should be grown on the Quince.

3. That the Quince should be considered in this compound tree, only as a root, and never as a trunk or stem; and, therefore, should be planted entirely below the soil.

4. That the tree should be trained low, in the pyramid shape.

5. That weeds and grass, and, of course, the grains, must not be permitted to grow among the trees—as they would interfere with the development of the lower limbs, and abstract the nourishment that should go to the tree.

6. That the soil should be kept in good condition, well manured, well cultivated, and dry.

The violation of these rules has, without doubt, been the cause of all the failures of the Pear on the Quince.

ROOTING OF THE PEAR ON QUINCE STOCKS.

It is very difficult to induce the Pear to form roots from cuttings or layers, under the ordinary circumstances attending such propagation. Most varieties of the Pear, however, when budded on the Quince, and planted with the junction from two to four inches below the surface, exhibit a great tendency to throw out roots from the pear wood above the junction.

Mr. Wilder, and some other horticulturists, believe this to indicate a natural repugnance in those varieties to the Quince; but my own experience does not confirm this. Of a considerable number of Bartletts removed after being three years planted in the fruit-ground, not more than half a dozen had rooted, and these very feebly; while it is well known that this variety succeeds only indifferently upon the Quince. Other facts, however, do tend to confirm this theory. I have seldom found the Duchesse exhibiting any tendency to throw out roots. While of several hundred of other varieties, five or six years old, removed at the same time with the Bartletts above-mentioned, more than half had rooted from the pear wood, and the character of the roots was somewhat striking. When a wild or seedling pear is budded and planted in the fruit grounds, its tendency to form long, straggling roots, almost destitute of fibres, unless root-pruned or retransplanted, is well-known; but every one of the roots from the pear wood above the quince stock of these trees, was provided with such masses of fibres, that it was nearly impossible to free them from the adhering soil. Remarkable as is this faculty of fibrous rooting of the Quince, it is much more surprising in the Pear, when grown on the quince stock. Many roots, three or four feet long will be found, fringed with fibres throughout their entire length, and in such masses as to render it necessary to greatly thin them, when reset in the ground, to allow them to be separated by particles of soil. In some cases, I have found the quince root entirely superseded and cast off. In others, the double root seemed to be in perfect harmony, and both parts thrifty and vigorous. In most cases the pear root had been formed on one side of the tree, and rapidly radiating and swelling at the junction, had usurped the entire ground, and held the tree firmly and strongly in the soil. To test the fact of the rooting of the Pear above the Quince, it is only necessary to seize the tree by the body three or four feet above the ground, and shake it slowly, and if pear-rooted, the superior firmness will be readily perceived. The wood-growth and foliage of all trees, throwing out roots above the quince stock, will be found to be more vigorous, but the production of fruit will be considerably delayed. If a strong, vigorous shoot or sucker grows up from near the ground, or if the branches are much more strongly developed on one side, it is quite certain that the Pear has rooted. I am often asked, if the tree roots from the Pear, what advantage is gained by growing upon the Quince?

This query may be answered by a statement of the following facts:

First. Many of the varieties budded on the Quince do not obtain pear roots sufficient to support the tree before the sixth or eighth year, and the trees, in the mean time, have borne fruit three or four years, while if budded on the pear stock, few of them would have yielded fruit in less than eight or twelve years.

Second. The greater vitality of the Quince root has preserved life in a large per-centage of the trees, which, under ordinary care, would have perished if budded on pear roots. The ratio of loss by transplanting healthy trees on quince roots, with but moderate care, is not more than one per cent, while that of pear trees on pear roots, is much greater. After the pear roots form above the Quince, the tree is (from causes which will be hereafter investigated) so much better furnished with fibres, that it will endure transplanting and root pruning better, and also continue much longer its growth and fruiting.

Third. The quince root has so governed the growth of the tree, that it is much less difficult to reduce it to pyramidal shape; for it has been proved by experience, that the character of the roots determines that of the top. Long, straggling roots, not provided with fibres, are productive of long, vigorous, and unmanageable shoots, destitute of lateral branches. A long tap-root sends up a vigorous leader, while the fibrous quince roots provide the tree with fruit-spurs and short, stout branches. The Pear on a pear stock is not easily reduced to a pyramidal shape after the first year, without root pruning, for when the leader is pruned, the terminal bud shoots with great vigor, and another leader is formed while the lower branches continue weak and feeble.

Fourth. Most of the varieties which are superior in size and flavor on the Quince, or which unite firmly with it, and prove well adapted to it, as the Duchesse d'Angoulême and Louise Bonne de Jersey, seldom throw out roots from the pear wood. In those varieties which throw out pear roots, it has been seen that the latter are more fibrous than upon seedlings. This is, doubtless, the result of the more refined and cultivated condition of the grafted wood, which, instead of the rank characteristic of a seedling, makes the clean, stocky shoots of a more highly developed tree. So the finer varieties of pears, instead of the long naked roots of the wildling, provide themselves with fibrous radicles better fitted to furnish them their proper food.

This fact has tended to confirm horticulturists in the belief in the necesity of an adaptation of the graft to the stock. If this theory is correct, what roots can be better adapted to the demands of the graft than those put forth by the graft itself. From these facts, it may be seen that if any pear-grower is deficient in faith in the durability of quince stocks, he can insure the longevity of his trees by planting them sufficiently deep to produce pear roots.

HOW TO PRODUCE PEAR ROOTING.

When the leaves ripen in early September, the sap has assumed that albuminous and ripened condition which fits it for forming new spongioles and rootlets. If, prior to this condition, several incisions are made in the pear bark and wood, just at the swelling of the graft, by pushing a small gouge upwards, so as to form tongues or strips an inch long, hanging by their upper ends; the sap, checked in its downward flow, will soon cover the incision with a soft, white, albuminous substance, which, if well covered with firmly packed earth, will soon form rootlets, that, before the ensuing winter, will be in a vigorous condition. It is well to place a small pebble between the tongue and trunk to prevent adhesion. The production of these roots is due to the same influence which causes the union of the bud with the stock when inserted at the same season. The sap, in its downward flow, depositing the mucus that would have hardened into bark and wood, is, by the check, diverted to the formation of rootlets and fibres which will, the next year, provide food for growth or fruit.

It does not seem to have been considered by horticulturists, that the absorbing powers are not retained by spongioles and rootlets much longer than a single season, and that they need constant renewal. When the hardening of these spongioles takes place, they are no longer capable of affording a supply of nutriment proportionate to the wants of the tree. Most tree culturists will have noticed that the fibres and spongioles are not found on the larger and older roots, but that, having fulfilled their office, they decay, as Nature never supports useless organs.

What will be the effect of pear-rooting upon those varieties that are so much superior upon the Quince, must be determined by more experience than we possess at present. There is but little doubt, however, that the pear-rooting of such varieties as are gritty or astringent on pear stocks is to be avoided.

The Duchesse d'Angoulême, which is not often first-rate on pear roots, because of its hard lumpy flesh and gritty core, and the Louise Bonne de Jersey and Beurré Diel, which are often astringent and bitter, on the same stock, can hardly be allowed to root from the pear wood. This may be prevented when necessary, by planting more shallow, leaving the pear-wood but little below the surface.

DOUBLE WORKING.

It is often desirable to improve the texture and flavor of some varieties of pears, by growing them upon the Quince, although they have proved unadapted to it. The desired effect is obtained by double working—as it is the roots, the providers of nourishment, that govern to a great extent these characteristics in the fruit. Any free-growing varieties may be budded on the Quince, for the purpose of double working, although some care should be taken to obtain such as harmonize with the Quince. The Virgalieu and the Buffam are the best, although not the most vigorous growers; yet most pears grow well, when propagated upon them.

The Beurré d'Amalis and Soldat Laboureur, are very vigorous growers, and make good stocks for double working. There are such obvious advantages in double working, that it seems almost superfluous to mention them, yet that nothing may be omitted to secure success, we present them in a concise form:

1. Pears that refuse to grow, or grow but feebly, or are short-lived upon the Quince, but are coarse, gritty, or small sized, when grown upon the pear stock, like the Beurré d'Aremberg, often become first-rate by double working.

2. Varieties that are so tardy in bearing upon the pear stock as to exhaust the patience and faith of the grower, yet will not harmonize directly with the Quince, will, by double working, come early into bearing. The Dix and Seckel are examples of this.

3. Grafting, which cannot be practiced with success directly on the Quince, may be performed on the Pear portion of the stock.

4. Some varieties that bear quite early on the pear stock, but are of comparatively slow growth, are produced in greater vigor upon the double stock, in consequence of the increased vigor acquired from the strong growing variety first worked upon the Quince.

VARIETIES FOR DOUBLE WORKING.

The following varieties, which have proved averse to the Quince, will, by double working, bear fruit improved in texture, size, and flavor:

Beurré d'Aremberg—coarse, woody, and gritty, on pear roots, and a feeble, diseased grower, directly on the Quince.

Napoleon—often scarred and spotted on the Pear, but frequently handsome and smooth upon a double-worked tree.

Bartlett—although fine when grown on the pear stock, is much improved on the Quince.

Beurré Clairgeau—coarse on pear roots, somewhat averse to the Quince, but nearly first-rate upon double-worked trees.

The following varieties, that are tardy in bearing, are but moderately improved by the Quince in quality, and are propagated with difficulty upon that stock, but may be profitably grown by double working:

Beurré Bosc, Dix, Seckel, Tyson, Andrews, Fulton, Lawrence, Winter Nelis, Marie Louise, Beurré Rance, St. Michael Archange, Columbia.

PART V.—PRUNING.

ADVANTAGES OF A PYRAMIDAL FORM FOR PEAR TREES, BOTH ON QUINCE AND PEAR STOCKS.

The advantages which seem to be gained by a pyramidal growth in the pear tree, more especially, are:

1. There is no violent interference with the natural structure of the tree, but we rather aid it to attain this form more perfectly; that is, we do not by crowding it in the nursery rows, or by cutting with the pruning-knife, deprive it of the natural formation of low branches. To cut any portion of the wood, of more than one year old, is to interfere more or less seriously with the organism of the tree; and the occasion for it arises from neglect to prune at the proper time. To prevent malformation is better than to amputate; and to form a tree properly, we must begin with the maiden plant.

2. Low-branched pyramids come into bearing much sooner than trees with long trunks. The Pear, on its own stock, trained as a standard, varies with the kind, from eight to twenty years, in producing fruit; but, trained as a pyramid, its period of fruit-bearing is lessened from four to twelve years. The Seckel and

Urbaniste, upon pear stock, and with naked trunks, of five or six feet, are not unfrequently fifteen years producing their first fruit. With low-trained pyramids, and a slight attention to summer pruning or pinching, this tedious and discouraging delay is most certainly shortened to six or eight years. The cause of this precocity is, that the sap, checked by the summer pinching in its flow to the terminal bud, is distributed to the wood-buds below, and sufficient nutriment is received to mature them into fruit-buds.

A certain age of bark and cellular woody formation of a branch is necessary before it will cause the sap to flow slowly enough to concentrate into fruit-juice. Now, if the earlier branches, formed near the ground, and then, in succession, those above, are cut away, until a naked trunk is formed, it is evident we protract the fruit-bearing period. Besides, the pruning away of so much wood forces an over-abundance of sap to the terminal buds, and its energies are spent in wood-growth, at the expense of fruit-bud formation. When, however, branches start from or near the ground, having the same age with the trunk, fruit-buds are formed long before they could have been on long-trunk trees; the sap is more evenly distributed, wood-growth is moderately checked, and the cultivator's eye is early gladdened with golden fruit.

3. The size and quality of fruit is much increased by this method of training. It has long been known, that young trees produce larger fruit, but deficient in flavor; old trees produce fruit of superior taste, but inferior in size. In the pyramid, we are able to secure these excellences, and rid ourselves of the faults. In

the low, compact form, when an excessive quantity of fruit has set, it becomes an easy task to thin out the overplus, and concentrate the sap in that number which can be perfectly matured.

4. A much larger number can be planted on a given area. Instead of forty pear trees, planted at forty feet apart, two hundred to four hundred may, for many years, occupy the same area, and yield their fruit to a whole generation without crowding. It is much easier to cut down a fruit tree that cost a few shillings, than it is to obtain it with fifteen years' additional growth for ten dollars. Many a man would hesitate to plant ten acres with four hundred pear trees, even when by pyramidal growth he could obtain a bushel from each, at six to eight years of age, who would gladly cover one acre with the same number, could he be assured that they would fruit equally well.

5. Pyramidal trees, by their comparatively low stature, are protected from high winds, and often preserve their fruit when the tall tree has lost a large portion of the crop: their limbs are much less exposed to being broken by storms, or borne down by weight of fruit—whose power is much increased by growing at the end of a long branch, which acts as a lever.

6. Pyramidal trees are less liable to wrenching from the perpendicular, turning over by the roots, or breaking off: having their widest diameter at or near the ground, they offer little resistance to the wind; and never exhibit the distorted, leaning attitudes that characterize thousands of orchards.

7. The trunk is protected by the foliage from the

parching sun-rays, and the sap reaches its destination just in the condition Nature provided it in the roots, without travelling an unnecessary distance.

PRUNING TO FORM PYRAMIDS.

It is with considerable difficulty that trees in the usual condition in which they are received from the nursery are reduced to a pyramidal form, branching from near the ground. If two years old from the bud, and lateral branches should have formed, the ruthless knife of the nurseryman has pruned them away. Figs. 33 and 34 are specimens of trees where some feeble attempts have been made for the production of a pyramid. The lower cross lines in Fig. 34 indicate the vicious pruning such a tree would usually

Fig. 33.

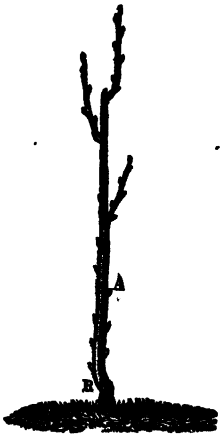
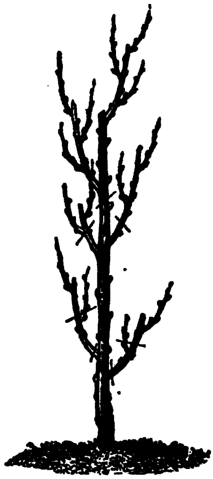


Fig. 34.



receive. The other lines show the points at which the limbs and trunk should be shortened.

Having shortened the tree shown in Fig. 33, at A, the next effort of Nature is to effect an aeration of the sap produced in the roots, and as there are but few buds to expand into leaves, a large amount of sap is thrown upon these few.

The difficulties in forming pyramids from such trees are numerous. Unless the tree has been root-pruned, or recently transplanted, an effect of this severe shortening, called by horticulturists suffocation, ensues, and a sickly growth of small shoots is the result. Not unfrequently, several shoots start from near the amputation in a bushy cluster, or a gourmand or two obstinately shoots up, absorbing all the sap. It will now become more and more difficult to draw out the buds below, and, after the bark is two years old, almost impossible.

Under this treatment, we must thus commence our pyramid with a raw amputation, that will exhibit for years an ungainly scar, but there is nothing less severe to be done until we have better-formed nursery trees, and can remedy some of these evils, by commencing the process in the first season, as shown at Fig. 35, which has been already explained on page 99.

If the tree shown at Fig. 33 is planted in the same season of its shortening, but little growth, of course, will be produced during the first year, but if perfectly successful in avoiding all the mishaps noted, it will, at the end of the second year, exhibit somewhat the appearance of Fig. 36. If more shoots should have been produced than necessary, they must be thinned so as to leave the remaining ones well balanced around the stem. Select one for a leader, that as nearly as possible occupies the centre of the group, and starts near the top. All the shoots ought now to be shortened in such a manner as to induce a cone shape to the tree. To effect this, the lower ones should be cut back to six or eight inches, the next reduced two inches more, and the next still more, until, as we approach the leader, the side shoots must be shortened to two or three buds. From this time, with proper attention to summer pinching, pruning might be almost entirely dispensed with; but as few persons will or can bestow the requisite labor, we shall still adapt the instructions to the ordinary condition of trees.

Fig. 85.

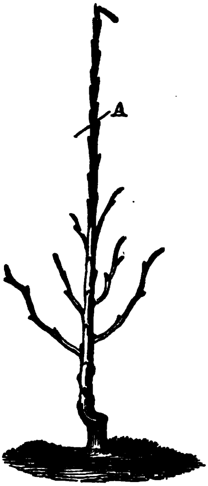
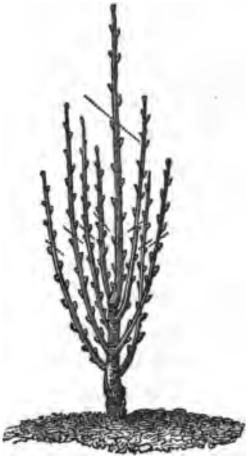


Fig. 86.



By attention to former suggestions, the tree, at the end of the third summer, may be expected to appear as in Fig. 37, and from this time, the progress of the tree in growth and shape is much more rapid. The trees exhibited at Figs. 37 and 38 are often exceeded in size by such as have been planted a year less, but they are much oftener not equalled in this respect by trees planted four or five years.

Fig. 37.

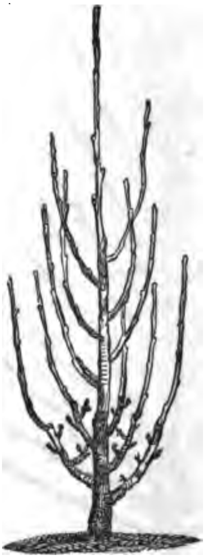
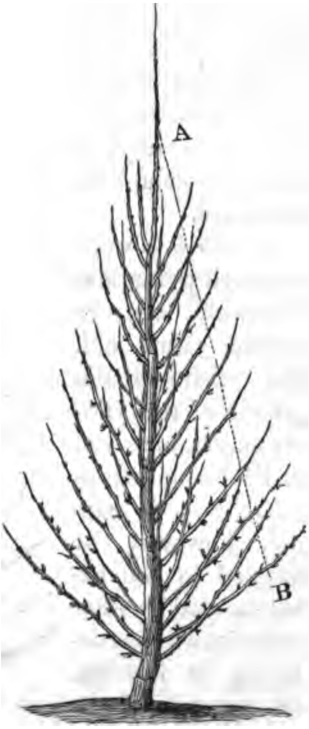


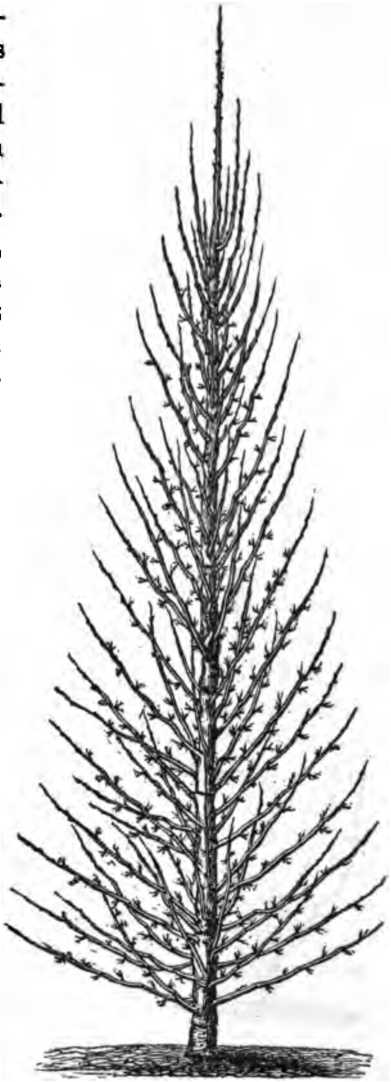
Fig. 38.



When the pyramidal shape has become established, as in Fig. 38, the pruning is performed more directly with the intention of inducing the formation of fruit-buds, but the preservation of the shape must still be kept in view. The line AB in Figure 38 indicates the place at which the branches should be shortened.

Fig. 39 is a well-balanced pyramidal Urbaniste, ten or twelve years old. The characteristic growth of this variety may be observed in its too numerous branches. It cannot, however, be thinned to the extent needed by other varieties without delaying its fruiting, on account of its great tendency to wood-growth.

Fig. 39.



Although the pyramidal form has become established, this tree would soon grow out of balance if neglected. It will require annual pinching and summer checking of the leading shoots not only for the purpose of restraining them, but to preserve the development of the lower branches.

From neglect or bad pruning, it is not unfrequent that trees acquire a growth similar to Fig. 40, which is a portrait of a tree in my own grounds. In its first pruning, the stem was left too high, and, in consequence, a long space has occurred at A and B, free from radial branches. After some subsequent pruning, a gourmand, indicated by C, has pushed out from near the collar.

Another error in pruning is shown at D, where a cut was made too far above the bud, or the branch. The highest shoot in this tree has abdicated the leadership, and a strong rival has pushed up from below it. Some of the methods of remedying the numerous evils in the condition of this tree, without shortening it back so severely as to lose three or four years in its fruiting, will be noticed. To cover the naked space on the stem, the shoots A and B, Fig. 40, may be ingrafted by cutting them to a wedge shape, at A and B, and fitting them into a notch in the stem, made with a chisel, or by removing small sections of bark from both the stem and the shoot, and binding the two firmly in contact. The gourmand may be used for ingrafting upon the trunk, at G, but when not used as a graft, it should be cut at F, in order to conceal the trunk with foliage. The branch and part of the stem, at D, should be entirely removed, in order to allow E to become the leader. All the branches should be shortened, the upper to three or four inches, and the lower to six or eight, and the leader to ten or twelve. Fig. 41, represents, at A and B, the incisions which are made above a weak bud, or shoot, to check the flow of sap, and force it to their development, C is the incision made below a strong shoot to check its growth.

Fig. 40.

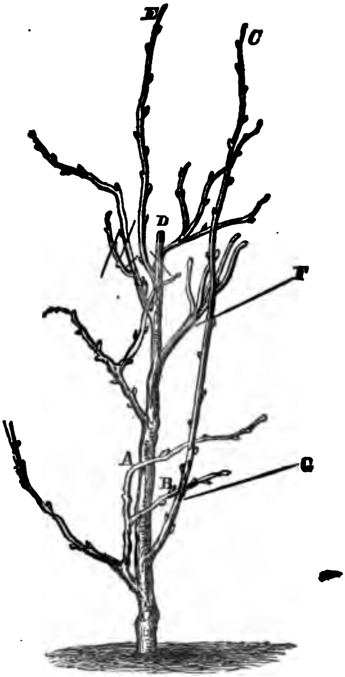
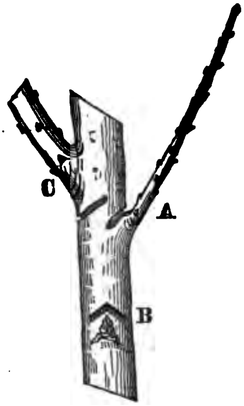


Fig. 41.



It is important in pruning, to cut so near a bud that the wound will be within the influence of the sap, elaborated by the leaves formed from that bud. If cut as in Fig. 42, the wood above the bud being beyond the flow of sap, usually dies, and produces a bad effect. The cut in Fig. 43 is made so low as to endanger the life of the bud, and effect the same bad result, as in cutting too high. The true rule for cutting a bud is, to make the slope reach no lower than the bottom of the bud, and high enough on the side of the shoot nearest the bud to clear the top of the latter. Fig. 44 represents the true cut.

Fig. 42.

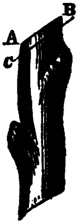


Fig. 43.

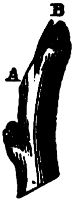
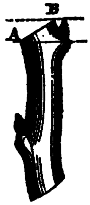
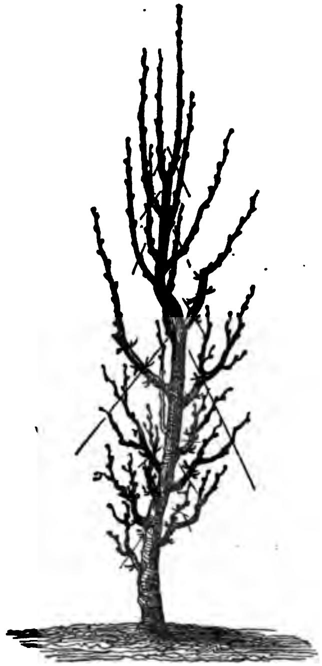


Fig. 44.



An irregular form of trees growing on quince roots, and resulting from overfruiting, is exhibited by Fig. 45. The check to wood-growth, caused by the early fruitfulness of the tree, resulted in the change of most of the buds to fruit-buds. When a period of rest from fruiting occurred, and the tree had acquired strength for further growth, this was all produced at the top of the tree, and thus its balance destroyed. To remedy this, the tree may be either shortened at the point indicated by the long lines, or the limbs pruned at the small cross lines, and the lower part kept from fruiting for a year or two. Combined with summer pinching of the top shoots, this last method will restore the shape without losing the growth of two or three years.

Fig. 45.



I am often pained at being obliged to cut away half a dozen luxuriant shoots, three to five feet in length, the growth of the preceding summer, upon a tree, which, by their production, was thrown entirely out of balance. But most two-year-old trees, if previously neglected, prove too obstinate in their acquired habit of growth, to form easily into pyramidal shape. The bark has become too old for buds to break from, without cutting so low down that one may almost as well begin with budding the stock, thus going back to the very formation of nursery treatment.

As the fruit-raiser may save several years' labor and delay by selecting large trees, it will be seen that it is of considerable importance to obtain those that have received proper care in the proper time. When well-shaped trees, two to four years old, cannot be procured, it is better to select maiden plants, or those of a single season's growth, as shown in Fig. 29.

SUMMER PINCHING.

This process consists in checking the growing shoot during summer, either by the thumb and finger or the knife. Sometimes the soft terminal tuft of leaves is pinched entirely off, sometimes a considerable portion of the shoot is cut away, and occasionally they are simply fractured, and left hanging.

This labor may be performed from the first breaking of the bud to the middle of July, the time for its performance being governed by the need for shaping the tree.

As before stated, the perfect formation of a pyramid is commenced in the nursery. The plant budded the previous year should stand at sufficient distance from its fellows to allow its branches to radiate from the ground, for a foot on either side, without interference from them. Near the middle of July, the terminal bud should be pinched off as at Fig. 35. The wood, now in its succulent condition, heals over at once, and no scar remains.

By the loss of the terminal bud, the sap is distributed to the lower buds, and if, as usually occurs, radial shoots do not push out, the former are strengthened sufficiently to form strong shoots during the next season. The tree, if well grown, is, at the end of the first season, fully equal, for forming a pyramid, to the one exhibited at Fig. 36. By a regular system of summer pinching to restrain undue vigor of some of the shoots, no great interference with its organism need occur to preserve the pyramidal shape through all its future growth. I have often seen a difference of two years' growth in favor of summer-treated trees over those whose pruning was delayed until the wood ripened.

To induce the formation of fruit-buds, summer pinching is successfully resorted to. Fig. 46 exhibits a twig with wood-buds at A and B, and the soft summer growth beyond. If in July this is pinched off or only broken to remain hanging, as in Fig. 47, the small weak buds at A B will be strongly developed, and appear as in this last-mentioned Figure. At the swelling of the buds in the next spring, these will appear as shown in Fig. 48. In all these Figures, the shoot is represented as broken too closely to the buds.

Fig. 46.

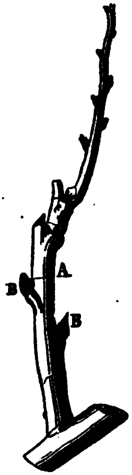


Fig. 47.

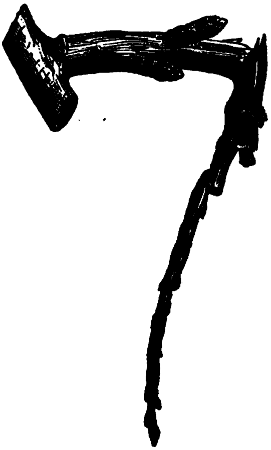
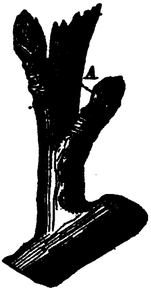


Fig. 48.



Summer pruning must not, however, be continued so late in the season as to induce an unripened growth. When several small shoots have formed from the upper buds after pinching, they should be removed in the subsequent spring, as they would tend to form a tuft of branches on the end of the shoot.

The treatment of fruit-spurs upon bearing trees forms no unimportant part of their management. The excrescence remaining at the base of the stem of a fruit of the Duchesse d'Angoulême is shown at Fig. 49. When this is cut at A, the small buds appearing at the base are developed in another year into the condition represented by Fig. 50. These fruit-spurs will now, if not displaced or crushed in gathering the fruit, become permanent, and afford a security for fruitfulness in the tree. Fig. 51 exhibits a cluster of fruit-buds on a spur, that has borne several times.

Fig. 49.

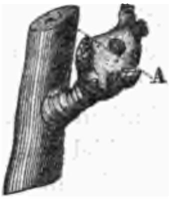


Fig. 50.

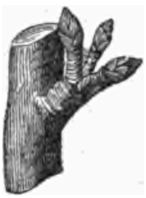
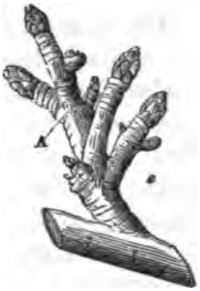


Fig. 51.



The rules for summer pruning and pinching may be condensed as follows.

1. To develop wood-buds on the lower part of the tree, prune all the branches closely in spring, and pinch the upper shoots during summer. If the upper

shoots push too strongly, deprive them partially of leaves, but allow the lower ones in the vicinity of the weak buds to grow.

2. Allow no useless shoots to absorb the vigor and sap of the tree—for every pound of them cut away might have been diverted to its proper growth.

3. To develop a weak branch, cut it back to two or three buds in spring, provided the rest of the tree be closely pruned and summer pinched, but the weak shoot must be allowed to grow unchecked during summer.

4. To check exuberant shoots, they must not be cut back severely at the winter-pruning, but summer-pinched and partially deprived of leaves.

5. Allow the strong branches to bear all their fruit, but deprive the weak parts of the tree entirely of fruit.

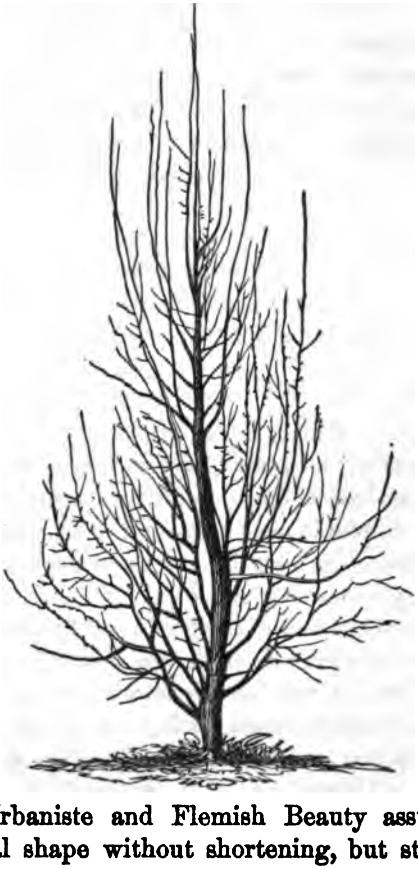
FORMS OF TRAINING.

Almost every variety of pear tree exhibits a distinct and characteristic growth. This inclination to a particular form modifies our control over the tree to such an extent as to render it impossible to mold some varieties into any of the shapes exhibited in the figures. Other varieties acquire the pyramidal shape so readily as scarcely to need the restraints of pruning.

Most of the leading varieties of pear trees can be recognized by their characteristic forms and color of the bark, almost as readily as by their fruit. The light yellow bark and open growth of the Bartlett and Duchesse, and the gray, densely-growing shoots of the Urbaniste, distinguish each of them as perfectly as the forms and colors of their fruits.

Fig. 52 is from a photograph of a Vicar of Winkfield, four years planted, which was only pruned at the time of its removal from the nursery.

Fig. 52.



The Urbaniste and Flemish Beauty assume the pyramidal shape without shortening, but still differ widely in their natural structure.

Fig. 53 represents a tree, the lower part of which has ceased to grow, in consequence of over-fruiting. To reduce this to a pyramidal shape, without pruning away a very considerable portion of the tree, requires judicious pruning. Cut the lower, unnourished branches back to three or four inches. Leave the remainder until the next spring, when the branches extending beyond the lines in the Figure are to be cut off; but during the summer, the upper and more vigorous branches are to be checked by pinching, and partially depriving of leaves, in order to throw the sap into the lower ones.

Fig. 54 represents a pear tree trained as a column —one of those eccentric forms attempted by French gardeners, which cannot be recommended.

ESPALIER AND QUENOUILLE TRAINING.

Happily for fruit-growers of this country, they are not compelled to resort to the laborious, artificial means practiced in other countries for the production of fruit; but as it may be desirable at some time to employ these methods for ornament or local convenience, they are here given.

In Espalier training we should commence with the first summer's growth from the bud. The terminal bud is pinched out in the latter part of June, and when lateral shoots push forth, they are cut off on two opposite sides, leaving those on the two other sides. If these push out regularly, two or three pairs are allowed to remain, and the stem cut back to them.

These are trained to the lattice or wall, and fastened in the fall. The next year another pair or two are

Fig. 53.

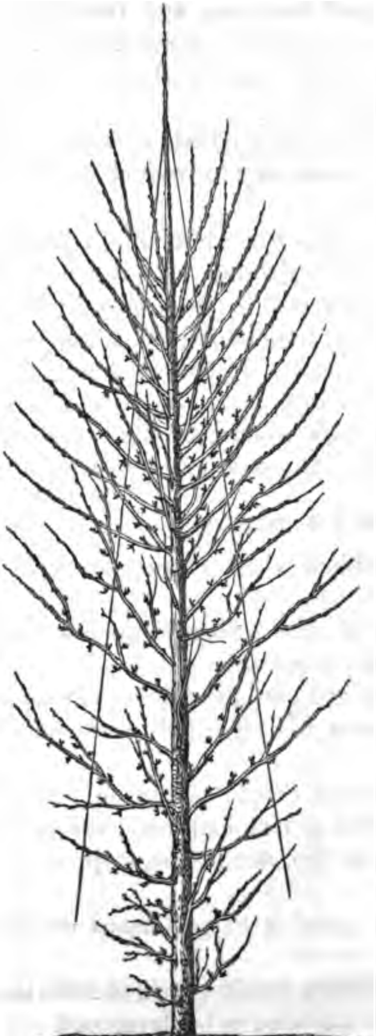
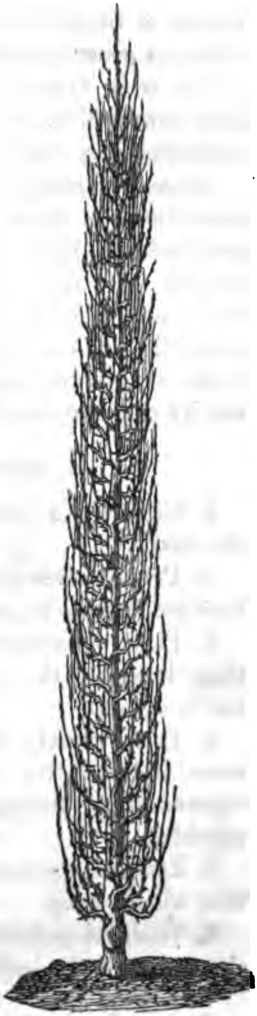


Fig. 54.



produced at the proper distances, and fastened as before, guarding, however, against allowing horizontal shoots to be produced more rapidly than a strong, vigorous growth will permit.

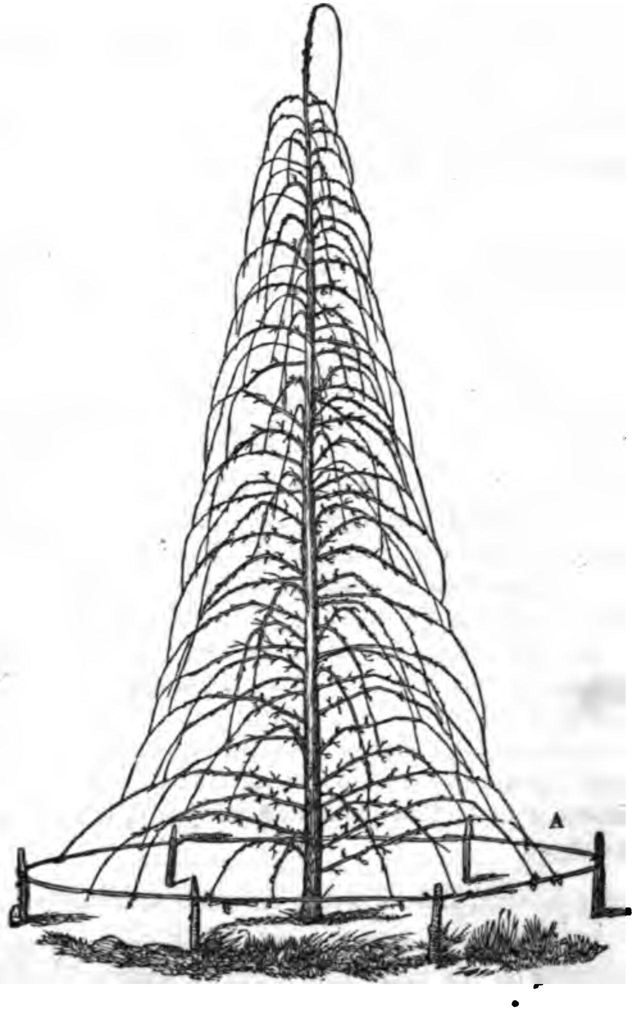
The term Quenouille is misapplied in fruit-books. It is now applied in France only to trees of the form represented in Fig. 54.

Arched training, as shown in Fig. 55, is nearly abandoned in France and Belgium. It is generally confessed to have produced the most ugly and ill-shapen trees imaginable, besides requiring immense labor and unremitting care. It consisted in tying down the ends of shoots to pegs on the ground, until a drooping habit had been produced, or the check of sap by the compressure has induced fruit-bearing.

RULES FOR PRUNING.

1. Cut near a wood-bud when pruning to perfect the shape.
2. Prune severely in the spring those branches that are desired to grow vigorously.
3. Pinch in summer and partially deprive of leaves those branches that grow too vigorously and absorb too much sap.
4. Thin, weakly shoots should either be pruned close, or left entire with a terminal bud: the more vigorous ones being, at the same time, stopped by pinching.
5. Let the severest pruning be performed on the tree when young.
6. To develop fruit-buds, break, pinch, or twist the shoots above the buds intended to be developed.

Fig. 55.



7. Prune when the sap is active, that the wound may heal quickly.

8. When trees are tardy in coming into bearing, prune severely in spring, pinch constantly in summer, and root-prune in early autumn.

9. When a tree has been removed, prune off the branches in proportion to the loss of roots.

SEASON FOR PRUNING.

Mr. DOWNING recommended winter and fall pruning of fruit-trees, without regard to kinds. This is the general practice; but as relates to the Pear, it is beginning to be thought erroneous by the best pomologists. Wounds made in winter pruning cannot heal over until the sap shall deposit the matter that ripens into bark and wood. In the meanwhile, the raw cut becomes dry and checked, the end of the branch usually dies down for some distance, and requires a new cut in the spring. The best season for pruning the Pear is after the buds begin to swell in April, until the new leaves are half formed.

All the wood that requires removal should be pruned at this season, to economize the sap before it has been wasted in wood growth, that will need to be pruned away. Pruning, however, beyond the 1st of July should be avoided, as it induces a late succulent growth, that remaining unripened, is subject to blight.

ROOT-PRUNING, AND ITS EFFECT ON SHAPE AND FRUITING.

It has long been known, that an obstinate variety growing on the pear stock, might be hastened in its fruiting, by separating some of the roots, thus cutting off the abundant supply of nutriment that increased the wood-growth at the expense of fruit formation. The first object of this process is, to produce fibrous roots, instead of the long, naked ones which support the tree; for fibrous roots alone provide the proper sap for forming or sustaining fruit-buds.

When a root is smoothly separated in the last of August or first of September, with a sloping cut from the under to the upper surface of the root, the returning sap forms upon the edges of the cut innumerable fibres and rootlets. The tendency to form roots at this season from every abrasion beneath the surface is so great, that even the young shoots of the Pear will form roots, if half cut through and layered.

The effect of root-pruning is to render the pear tree more manageable; its growth being more equally distributed around the tree, instead of assuming the rampant form of the gourmand. Most varieties, tardy in bearing upon the pear stock, may be hastened six or eight years in fruit-bearing, by root-pruning. The Dix, Seckel, Beurré, Bosc, and others, that are averse to the Quince, by root-pruning may be fruited in four or five years. Pear trees, several times root-pruned, may be removed with almost absolute certainty of success, at almost any age or size; so that the favorite trees of a tenant may be removed from the premises he quits, with his furniture, and the regret at leaving objects of care and skill may be entirely avoided.

Upon this subject, nothing can be said of so much interest, and worthy of so much attention as the following from Mr. Rivers, of Sawbridgeport, England.

Mr. R., it should be said, confines his remarks entirely to the Pear upon the quince stock, while instructions for root-pruning generally refers to the Pear on pear roots. Mr. Rivers says:

"I must premise, that handsome and fertile pyramids, more particularly of some free-bearing varieties, may be reared without this annual, biennial, or triennial operation. I have a large plantation of pear trees on Quince, which bids fair to make handsome and fertile pyramids, yet they have not been root-pruned, neither do I intend to root-prune them. But I wish to impress upon my readers that my principal object is to make trees fit for small gardens, and to instruct those who are not blessed with a large garden how to keep their trees perfectly under control; and this can best be done by annual, or at least, biennial attention to their roots; for if a tree be suffered to grow three or more years, and then root-pruned, it will receive a check if the spring be dry, and the crop of fruit for one season will be jeopardied. Therefore, those who are disinclined to the annual operation, and yet wish to confine the growth of their trees within limited grounds, by root-pruning—say once in three years—should only operate upon one-third of their trees in one season. They will thus save two-thirds in an unchecked leafing state; and those who have ample room and space may *pinch their pyramids in summer*, and suffer them to grow to the height of fifteen or twenty feet, without pruning their roots. I have seen avenues of such trees, in Belgium, quite imposing. Pyramidal trees on the quince stock (and we would add, on the pear stock also), when the fruit-garden is small, and the real gardening artist feels a pleasure in keeping them in a healthy and fruitful state, by perfect control over the roots, should be operated upon as follows: A trench should be dug around the tree, about eighteen inches from the stem, every autumn, just after the fruit is gathered, if the soil be sufficiently moist—if not, it will be better to wait till the usual autumnal rains are fallen, and the roots carefully examined, those inclined to perpendicular growth, cut with a spade, which must be introduced quite under the tree on all sides, so that no root can possibly escape amputation, and all the horizontal roots except those that are small and fibrous, shortened with a knife, to within a circle eighteen inches from the stem (if they have not spread out to this extent, they need not be pruned, but merely brought near the surface and spread out), and all brought near the surface as possible, filling in the trench with compost for the roots to rest on; the trench may then be filled with compost and the mold from an old hot-bed, equal parts will answer exceedingly well; the surface should then be covered with half-rotted dung, and the roots left till the following autumn brings its annual care. It may be found that, after a few years of root-pruning, the circumferential mass of fibres will have become too matted, and that some of the roots are bare of fibres toward the stem. This will cause them to give out fibres, so that the entire circle of three or more feet around the tree is full of fibrous roots near the surface, waiting with open mouths for the nourishment annually given to them by surface-dressing and liquid manures. Handsome pyramidal trees may be produced by shortening the shoots in the summer, and if they are inclined to grow too vigorously, occasional (say biennial or triennial) root-pruning by the spade, will be sufficient."

I here introduce Mr. Rivers' plan of root-pruning, although quite unadapted to our necessities, in order that the reader may have an opportunity of observing what is called high cultivation.

It should be understood by every one that reads this article, that the requisites for forming fruit-spurs are, fibrous roots well supplied with nutriment. While the trees are making only long cane-like roots, there will be no supply of sufficiently-digested pabulum for fruit.

The intention of most cultivators in this country being to produce large pyramids, the annual pruning of roots would be an unnecessary labor, especially on the quince stock. On the pear stock, biennial root-pruning, by thrusting down a spade, after having dug a trench one spade deep, at the proper distance from the stem, is sufficient. One other variation from Mr. Rivers' recommendations is the time in which this root-pruning is to be performed. If it is delayed until all fruit is gathered, the *Vicar* and the *Winter* varieties would lose the benefit of the descending and root-forming sap when the leaf is ripening. On the quince stock we have not often found that pear trees need root-pruning, since the great difficulty is to restrain their fruit-bearing tendency. The great cause of failure in cultivating these trees is their enormous overbearing, producing one great crop, and then remaining unhealthy, exhausted, and stinted for several years.

But, we repeat, in order to give emphasis to the truth, that root-pruning is quite necessary to the perfection of the pyramid form, unless the tree has had its training commenced with the young shoot from the bud.

PART VI.—DISEASES OF THE PEAR.

THE Pear has several times in this country been subject to most fatal epidemics. Men and animals are not alone the victims of pestilence, but Nature suffers these violent perturbations through all her dominions. It is not surprising that the sudden loss of one tenth of a fine pear orchard should discourage and alarm the fruit-grower; still he ought not to forget that its cause is exceptional, and will pass away. These diseases, though prevailing for several seasons in succession, occur only at long intervals; and the period of a disease being terminated, we may usually calculate upon exemption from it for a considerable time.

WINTER, OR FROZEN SAP BLIGHT.

The diseases of the Pear, known by Pomologists as Leaf-Blight, Summer-Blight, Winter-Blight, Insect-Blight, and Frozen-Sap-Blight, are generally, at present, recognized under the two latter terms, though we think the leaf-blight an entirely distinct disease. There has been so much speculation upon the causes of *Winter* or *Frozen Sap Blight*, and so many remedies recommended, that we are not prepared to adopt any of the theories in explanation of it, or any nostrum as a specific.

The pear tree is a greedy absorber of fluids, and when the warm rains of September excite its absorbents, the gourmand drinks up large quantities of nutriment, and a late and rapid growth of shoots is formed. In these succulent and unripe growths, the sap is retained without that vitality of leaf which will effect its maturity and assimilation, being thin and watery, and not sufficiently matured to enable it to resist the frost, and death ensues. In the plant as well as the animal, great length of time often elapses before the poison affects the whole system and causes death. It is not unfrequent that the tree, poisoned in autumn, survives till the July following. The bark of the trunk and principal limbs exhibits black spots; and on cutting into them, the bark and wood, for some distance beneath, are found quite dead and black.

The only remedy is, to cut away at once all of the tree that is affected, cutting below the lowest spot. But few trees attacked with this disease will be of much value, even with the best treatment that can be given them. Out of forty trees, six or eight feet high, thus affected in one season, we succeeded in saving the stumps, two feet high, of only eight or ten. These trees had been brought from a distance, and planted the fall preceding the attack, and exhibited by their large, thrifty shoots, that rapid, unripe growth above mentioned.

The most successful means of saving trees from the ravages of this disease is to *avoid* its attack. The cause being late and unripe growth, it most frequently occurs on over-rich and damp soils, retentive of water, and abounding in vegetable and animal matter. To remove the excess of water, the best, and indeed the only means, is draining; the surplus rank vegetable and animal matter must be neutralized or decomposed by the application of alkaline substances—ashes, lime, marl, &c., which, as all experience shows, insure by their direct influence on the sap, a short, stocky, and well-ripened growth. Fifty bushels of lime, and half that quantity of ashes, scattered over an acre, and worked in with the plow, is an almost certain preventive of this disease, if previously well drained.

A strong evidence in support of this theory, is the fact, that this blight has never been known to originate on the dry sandy loam of Long Island, not even with heavy manuring; the drought of midsummer always ripening the shoots so completely, that the leaves fall a month before frosts commence.

If the character of the season and the continued growth of the trees, indicated by fresh green leaves and lengthening shoots, late in the fall, warn the cultivator of danger from this disease, he should remove the earth from the collar of the tree, down to the first roots, and around for some distance. This exposure will check the tendency of the roots to absorb more nutriment, and of course arrest the growth. The same result may be gained by root-pruning, whenever the other method is not convenient, or proves insufficient.

This disease, the most formidable that attacks the Pear, is distinguished by certain peculiar signs:

1. At the time of winter or spring pruning, by a thick clammy sap flowing slowly from the wounds —while a healthy tree exhibits a fresh, clean cut.

2. By the appearance, late in spring, of dead patches of bark on the trunk and limbs. This, however, is

sometimes the consequence of overbearing, in which case, the dead bark will often cover the living and most healthy wood and bark; yet this peculiarity is frequently the first stage of the disease.

3. By the extremities of the shoots in early summer shrivelling, turning black, and perishing suddenly When these are instantly cut away for some distance below the diseased parts, the tree may often be saved; but if the dead patches of bark, above mentioned, first make their appearance, the case is critical.

THE INSECT-BLIGHT.

The insect causing this blight is known among pomologists as the *Scolytus pyri*, and is one of the most minute of our numerous enemies.

In July or August it perforates shoots of sometimes two seasons' growth, and deposits its egg. The succeeding June or July, the branch is observed to wither and turn suddenly brown. The disease seldom travels below the point attacked, and if the part be removed immediately, is directly checked. The insect engendered near a bud eats its way to the pith, and there, by feeding upon the sap-vessels, destroys the organism that supplies life to the upper shoot. At the first appearance of the ravages of the insect, all the branches affected should be cut and burned—the attack must be sudden and energetic.

THE LEAF-BLIGHT.

This disease is indicated by a sudden spotting and premature ripening of many of the leaves. The growth is checked for a time, and if the attack is long-continued, or wide-spread, the fruit is lessened in size, and sometimes refuses to ripen. It is only serious, when appearing upon Pear seedlings, as it checks their growth, and prevents their being budded during the season of its attack.

It is very probable that the winter-killing of seedlings results in great measure from the previous feeble growth, as the roots produced are in exact proportion to the quantity of leaves, and the active vitality of the leaves being destroyed, the roots are too feebly developed to retain their hold in the soil. A curious fact in the history of this disease is, its confining its attacks almost entirely to seedlings and wild pears. A graft or bud of the finer varieties, of the greatest luxuriance of foliage, may not exhibit a single symptom of this disease, while the leaves of the stock will be entirely blackened. Its approach may be looked for, whenever warm and abundant rains are succeeded by hot, bleaching sunshine. The leaves of pear seedlings being very succulent, and in such a season as just described, accustomed to a moist atmosphere and a shaded sky, are not prepared for the great change, and consequently are scorched and blackened. When occurring in the seed-bed, I do not doubt that the close planting of the young trees occasions this result.

PART VII.—INSECTS INJURIOUS TO THE PEAR.

The *Scolytus pyri*, already mentioned, is a very minute beetle, not much larger than a flea. It punctures the young wood of the pear shoots, and deposits there its eggs. It is the larva of this insect that accomplishes the mischief. It is thus described by Downing: "The beetle is a deep brown, with legs of a paler color; its thorax is short, convex, rough in front, and covered with erect bristles. The wing-covers are marked with rows of punctured points, between which are also rows of bristles, and they appear cut off very obliquely behind." The larva completes its change by June or July, and gnaws its way through the bark, leaving a small round puncture.

THE SCALE INSECT.

This abominable and prolific nuisance is insignificant in appearance, but formidable in mischief. Trees of clean, smooth bark, sometimes in the single month of September, become so foul with this insect as to appear covered with bran-scales. These scales are not the insects, but cover small reddish *cocculi*, that when crushed with the finger-nail leave a spot of blood. They feed upon the more sluggish juices of the trunk and limbs. In a short time the tree becomes so infested with them, that the most vigorous efforts must be exerted to clear it of the enemy. Some of my trees had, by neglect, become so badly affected, that I saw no remedy would preserve them, and was compelled to cut them down. When the *cocci* are washed away, the bark appears rough and blotched, and presents a diseased appearance.

WASHES.—A solution of soda, or potash in water, not stronger than one pound of soda to one gallon of water, or one pound of potash to two gallons of water, is efficacious. But washes of this strength must not be applied to trees in foliage.

Whale-oil soap, dissolved at the rate of one pound to three or four gallons of water, is a most effective wash, and the efficiency is increased when the soap is dissolved in a decoction of refuse tobacco. Camphor is sometimes added; but this gum is somewhat costly. The wash of whale-oil soap may be used stronger, if applied when the leaves have fallen.

For the following, I am indebted to the pen and pencil of Mr. A. O. MOORE.

"If in the month of October the vigilant cultivator scrutinizes his young pear trees, he may be surprised at finding many of them strangely covered, on trunk and limbs, with a white substance, which at first may seem to be a mold or mildew, such as would be engendered by a damp situation. Upon attempting to scrape this off, a claret-colored liquid will smear the stem as if with blood. A close examination will show that this white substance is composed of small paper-like scales. If a scale is removed carefully so as to expose the under surface, it will at this season be found to cover a minute dark-red object, surrounded by yet smaller dust-like atoms. This is as far in our investigation as the unaided vision will carry us. A good microscopic lens will, however, reveal a family composed of a mother (as seen at

Fig. 57) with her numerous unhatched progeny, consisting of from twenty to fifty eggs—the breaking of which latter furnished the red fluid before noticed. After the eggs have been deposited, the body of the female contracts, as shown in Fig. 57. Previous to the first of October, I have found the insect under the scale without the eggs, but by arranging the light so as to produce a slightly transparent effect, the eggs may then be seen within the body of the parent, as at Fig. 58.

Fig. 56.

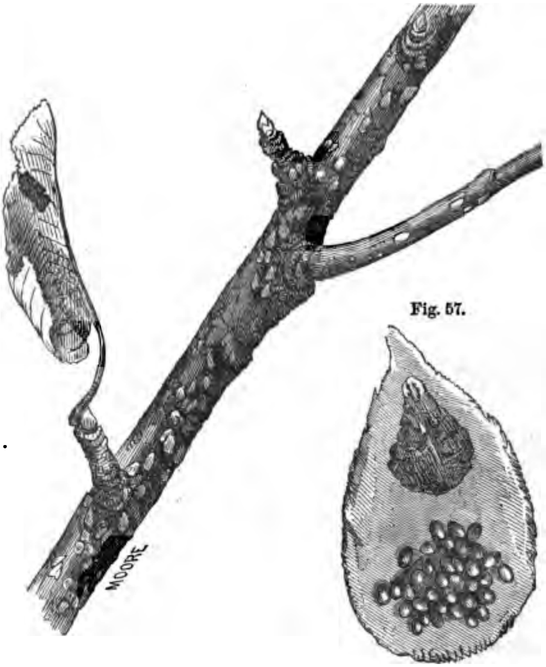
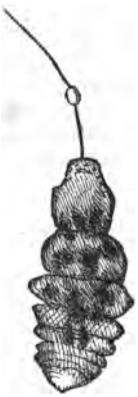


Fig. 57.

Fig. 56 represents a Pear branch attacked by the Bark-Louse. The insect being concealed under the white scales.

Fig. 57 represents the under side of one of the scales, with the eggs adhering, greatly magnified.

Fig. 58.



"At this time the insect appears almost lifeless, and probably it has already committed all the injury to the tree it is capable of inflicting: this injury consists in the abstraction of the juices of the tree. Around each minute paper domicil may be seen a discolored spot. It is not unusual to see a tree of eight or ten feet in height with every part of the stem and many of its branches whitened by this injurious insect. No tree thus attacked can be healthy.

"Trees situated in grass lands, or otherwise neglected, peculiarly invite this *sloven's pest.* Slow-growing varieties of the Pear are more subject to it than the rapid growing kinds.

"We will now consider the means of destroying this troublesome insect. It is probable that the time in which the injury is committed is during the summer months, although the insect, being not then invested with its paper-like covering, can only be discovered with difficulty. The practice of washing the trunk and main branches of fruit-trees with a mixture of soft-soap and water, one part of the former to two of the latter, applied with a coarse cloth, using considerable friction, can not be too highly recommended for the health and general thriftiness of the orchard. This application should be made in the spring, before the swelling of the buds, and again in early June—this time, however, greater care is necessary to avoid injury to the young shoots. The young insect is then about commencing its summer depredations, and all that escaped the spring washing may be easily destroyed.

"Where soft-soap can not be obtained, common hard-soap may be used instead; half a pound dissolved in two gallons of hot water. Harris recommends a solution of two pounds of potash in seven quarts of water, or a pickle consisting of a quart of common salt in two gallons of water. No preparation, however, I believe to be so safe and efficacious as the one first mentioned.

"Whale-oil soap, or even common hard-soap, placed in the 'crotch' of the principal branches, and allowed to remain until washed down gradually by the rains, will be found excellent for the general health of the tree, and prevent the attacks of this and many other insects.

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* Fig. 8 is a magnified view of the Female Bark-Louse before depositing her eggs.

> "Another species of the coccus has lately been brought to my notice, which seems to affect the Apple and the Pear in the same manner as the above, and is sometimes found upon the same tree. It has, instead of the white paper-like covering, a hard coriacious scale, of narrower and longer shape, and the eggs are pearly white instead of red. I fear that where this insect exists, it may prove a more troublesome enemy than the white scale, as its hard covering forms a more effective protection against the *wash* recommended."

After the coccus has acquired its shell, a simple washing will not remove it. It must be scrubbed off with considerable force, and in bad cases, with sand and soap.

THE SLUG.

The pear-slug is another insignificant, but troublesome enemy. This slimy and disagreeable fellow attaches himself to the upper part of the leaf, in June or July.

It is about half an inch long, and somewhat resembles a snail. It quickly devours all the succulent portion of the leaf, the skeleton of which remains upon the tree, and appears as if scorched with fire. Growth is stopped at once, and what fruit has set, never attains any considerable size. Dust, lime, ashes, and other substances, that will attach to the slime of the insect, will, if thrown upon the leaves where it is feeding, soon detach his hold, and cause him to fall off and die. Soapsuds, potash-water (made with six or eight gallons of water to a pound of potash), or strong tobacco-water, will speedily destroy this insect.

I am happy to be able to add the result of some investigations into the habits of this insect by Mr. A. O. Moore:

> "The insect which we familiarly call the Pear Slug (*Selandria cerasi*,)

represented in Fig. 59 is, at the period of its life when generally noticed by the cultivator, a greenish-black, club-shaped worm, with a thick rounded anterior extremity, and tapering towards the posterior. It is covered with a semi-transparent coat of slime, which exudes from the body, and, in the hottest sunshine, does not become hard or dry.

"While resting undisturbed upon the leaf, the tail or last segment of the body is slightly raised. At its greatest size, the worm is about half an inch in length; it is very sluggish in its habits, being rarely seen to move.

"The injury consists in its eating the upper skin of the leaf, while the lower skin and the veins are untouched; the leaves immediately assume a brown, unsightly appearance, while the proper function of the leaf, the elaboration of the sap, is almost entirely obstructed.

Fig. 59.

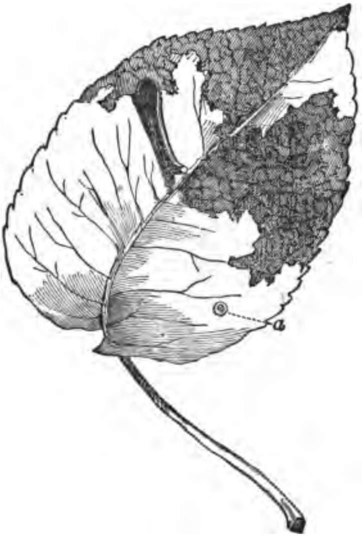


Fig. 59. The Pear-Slug full grown. The Leaf with its upper surface partially destroyed. (*a.*) The Egg deposited upon the upper surface of the leaf.

"Like all other insects, its existence may be divided into four stages: First, the *Egg;* second, the *Larva*, or worm state, which is peculiarly its eating and growing period; third, the *Pupa*, or dormant state;

fourth, the *Imago*, which is the perfect or winged state. In this last stage only are the differences of sex discernible; and by the Fly, or perfect insect, the eggs are deposited which reproduce the brood of destructive worms.

"This fly of the Pear Slug is described as a four-winged *Hymenopterous* (or wasp-like) insect, of a glossy black color. The wings are somewhat convex on the upper side, and slightly wrinkled, transparent, reflecting the colors of the rainbow, the anterior pair having a smoky band across them. The legs are tipped with a dull yellow color. The body of the female measures rather more than a fifth of an inch in length, that of the male is smaller. They make their appearance twice during the summer, the first time about the end of May or the first of June, the second appearance about the latter end of July. On each occasion they lay their eggs, and disappear in about three weeks.

Fig. 60.

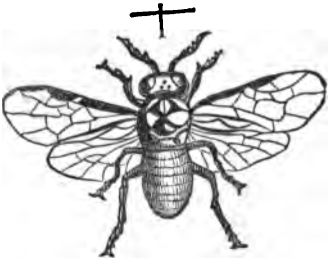


Fig. 60. The Perfect Insect or Fly of the Pear Slug—magnified. The cross lines represent the natural size.

"The slug fly deposits its eggs singly on the upper surface of the most matured leaves, covering it with a frothy, white, varnish-like mucilage, which surrounds it, and serves at once to attach it to the leaf, and to exclude the atmosphere. The small spot *a* on the leaf, Fig. 59, represents the size and form of the egg, which is seen as a dark center in the middle of a white spot. Fig. 61 represents the egg magnified, and the worm or young slug within the semi-transparent shell. Fig. 62 exhibits the egg also magnified, after the insect has emerged.

"When first hatched, the young slug is white, and can with difficulty be discerned by the naked eye; it commences immediately to puncture with small holes the surface of the leaf upon which it is produced. It soon acquires a covering of greenish-black slime, and is said by HARRIS to live as a worm twenty-six days, shedding its skin during that period

Fig. 61.

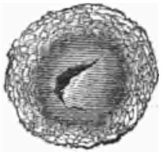


Fig. 62.

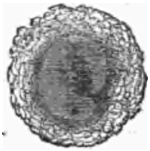


Fig. 61. The Egg magnified, with the Embryo Slug seen through the shell.
Fig. 62. The Egg empty after the Slug has escaped—magnified.

five times. Fig. 63 gives its appearance after it has shed its skin for the last time, with the forsaken skin lying near it. It is now much changed in color, being a brown-yellow, and somewhat diminished in size. In a few hours it falls to the ground, and immediately seeks to burrow into the soil. Descending to the depth of several inches, it forms a cocoon with a shiny brown interior surface, and a rough exterior, with grains of earth adhering. Fig. 64 shows a broken cocoon with the insect, now much further diminished in size, taken out. This is the *Pupa* or dormant state. It remains in the earth after its first appearance sixteen days, when it comes forth as the perfect insect, Fig. 60. The second brood remain in their subterranean retreat until the succeeding spring.

Fig. 63.

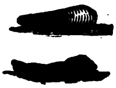


Fig. 64.

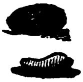


Fig. 65.

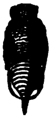


Fig. 63. (*a*) The Slug, after shedding its skin the last time. (*b*) The skin left upon the leaf.
Fig. 64. (*c*.) The Cocoon from which the insect has been prematurely removed. (*d*) The Slug after having commenced its change to the fly state.
Fig. 65. The Ichneumon Fly magnified; supposed to be of the species Encyrtus, taken from the egg of the slug.

"We will now consider the means for preventing or palliating the injury resulting from the attacks of the pear-slug. I would first remark, that the slug is found in much greater abundance on weakly growing trees than on those of strong and rapid growth. This fact points to the first and fundamental remedy, the securing of healthy trees, and by the proper enrichment and preparation of the soil, of a thrifty and uniform growth. Nature has provided a minute but formidable enemy to the slug, which serves very materially to check its increase. This enemy is a species of ichneumon fly, which is also of the wasp family. Soon after the slug fly has deposited its egg on the leaf, the ichneumon deposits its egg within the shell of the former, which developing to a minute grub before the time for the hatching of the slug worm, feeds upon the embryo slug, passing the whole period of its existence as a worm, and even undergoing the succeeding transformation through the pupa state, within the small space afforded by the egg of the slug, the natural size of which may be seen at *a*, Fig. 58.

"Fig. 65 exhibits the ichneumon fly as found in the egg of the pear-slug, nearly ready to emerge as a perfect insect.

"The application, at the proper time, of lime in a dry, or powdered state, while the leaves are wet with rain or dew, will provc effectual in destroying the egg before it is hatched, or the slug during the time of its depredations. If the number of trees to be treated is large, it will only be necessary to apply the remedy twice during the season, provided the proper stage of the insect's development is chosen. This should be as soon as possible after the eggs are all hatched, which is usually about the first of July with the first brood, and the first of September with the second brood. If applied earlier than the times mentioned, some of the eggs will not have hatched, in which case it requires much greater care and a larger quantity of lime; or if applied much later, many of them will have undergone their transformation into the pupa state, and therefore be beyond our reach. I have found this remedy always efficacious, and even plaster of Paris, ashes, or dust from the road, applied to the slimy coat of the slug, will cause it to sicken and die." "A. O. MOORE."

"NEW YORK, 140 Fulton Street, Oct., 1857."

The caterpillar, canker-worm, and apple-worm, which increase in size and number with such rapidity, are easily destroyed when attacked in time. The web must be crushed at its first appearance. The best method is not always the most pleasant; but all the operations of horticulture are not equally agreeable.

A thick buckskin glove should be worn; and with the hand thus protected, the nest should be grasped and crushed—being careful to press firmly all the crevices of the bark to destroy every individual.

There is but one method better, and this is to look carefully over the trees several times after the leaves have fallen; gather every leaf curled and gummed to the tree, and every circlet of whitish eggs attached to a limb, and put them in the fire.

The most effective and convenient allies in destroying insects are, birds and dung-hill fowls. When the latter are fed at distant and different spots about the pear grounds, they acquire a habit of wandering among the trees, and although generally shy of attacking caterpillars, yet their quick eyes no sooner detect a miller, a fly, or a beetle, about to lay eggs for an innumerable generation, than the hapless insect is deposited in the crop of some of the *gallinaceæ.* Wasps, flies, and moths are the parents of rapidly-increasing tribes, and by destroying one of them, we rid ourselves of thousands. Wide-mouthed vials containing molasses, and hung in the branches of trees, will catch large numbers: small bright fires made in various parts of the fruit-grounds, during the nights of June and July, will attract and destroy many.

PART VIII.—VARIETIES.

CONDITIONS WHICH AFFECT THE QUALITY OF THE FRUIT.

GREAT diversity of opinion prevails in regard to the excellence of every variety of the Pear. This arises from the different characteristics of the fruit when modified by circumstances. Some of the conditions unfavorable to the proper development of the fruit are:

First. The fruit of some varieties is small, astringent and insipid, while the trees are young, but large, delicious, and high-flavored, when the trees become older.

Second. The fruit may have remained too long upon the tree. Many kinds are nearly worthless unless picked as soon as the stem will cleave easily from the spur without breaking, and ripened with protection from the air and light. They then become nearly perfect.

Third. Some varieties are only second-rate when grown on the pear stock, but when grown on the Quince, are ranked as high as "best."

Fourth. Soils have great influence on the quality of Pears; incompatibility of soil often ruining the fruit of the best varieties.

Thus, from lack of knowledge of these conditions, many fallacious opinions have been formed, and much disappointment has followed the attempts to cultivate varieties which, though "first rate" in their original position, in other places do not find their special requirements.

TERMS RELATING TO THE QUALITY, SHAPE, &C.

Best, Pears that are of fine texture, melting, very juicy, and high flavored, and the term is applied only to those that possess all the qualities denoted by *buttery*, melting, juicy, and high-flavored.

Very good, denotes varieties that possess all but one of the above qualities in a high degree.

Good, is applied to those that lack some of the above qualities, or possess one or two of them in only a moderate degree.

Fair, indicates that the varieties have some claim to attention, but not enough to entitle it to a high rank.

Poor, designates those entirely unworthy of cultivation.

Pyriform, denotes the fruit with the small end at the stem, or approaching in form a cone.

Acute Pyriform, fruit tapering to a point at the stem, like the Beurré Bosc.

Obtuse Pyriform, the small end rather blunt at the stem, like the Bartlett.

Depressed Pyriform, the sides immediately below the stem sunken, as if forming an incipient neck.

Long Pyriform, neck very long, as in the Dix.

Obovate, denotes an egg shape, like that of the Vergalieu.

Turbinate, is roundish, but approaching a point at the stem.

Oblate, flattened at the ends like the Bergamots.

Pyramidal, regularly increasing in size from the base to the stem.

Large, a size ranging from the Bartlett to the Duchesse.

Small, ranging between the Seckel and Washington.

Medium, the size of the Lawrence and Vergalieu.

Calyx, the flower end, or the leaves of the flower which remain on the fruit.

QUALITIES REQUIRED FOR MARKET CULTIVATION.

In this selection of varieties, it has been the writer's purpose to include none which were of doubtful value, and which have not been proved, by the most ample experience, to be suited to general cultivation. The list is carefully made from comparisons of the experience of the best pomologists, as well as of ordinary cultivators, from Maine to Georgia, from the lists of Pomological Societies, and from the writer's personal experience and observation. The rules observed in the formation of this list are:

First. The tree must be hardy, able to withstand severe winters, a strong, vigorous grower, and not liable to crack in the bark, or to blight.

Second. The fruit must be of fair size, and if not of first-rate quality, must be large, and handsomely colored. The only exceptions are in favor of the long known and popular varieties.

Third. The variety must be prolific, and come early into bearing. The only exceptions are those admitted by the next rule.

Fourth. The trees must have considerable longevity, and be not easily exhausted by overbearing.

Fifth. Of the varieties grown on the Quince, only those are admitted which an experience of ten years, at least, has proved to possess great affinity for that stock, to acquire thereby higher flavor, greater size, and to come considerably earlier into bearing.

Sixth. No kind is admitted upon the list, whatever may be its excellence of flavor, size, or color, if it cracks, cankers, or rots at the core.

VARIETIES FOR MARKET CULTIVATION, TO BE GROWN ON PEAR STOCKS.

MOST of the kinds recommended for growing on pear-stocks may be grown on the Quince; but as their fruit is not materially improved in size and flavor, and as they sometimes fail on that stock, they are placed in the list for pear-stocks.

BARTLETT.

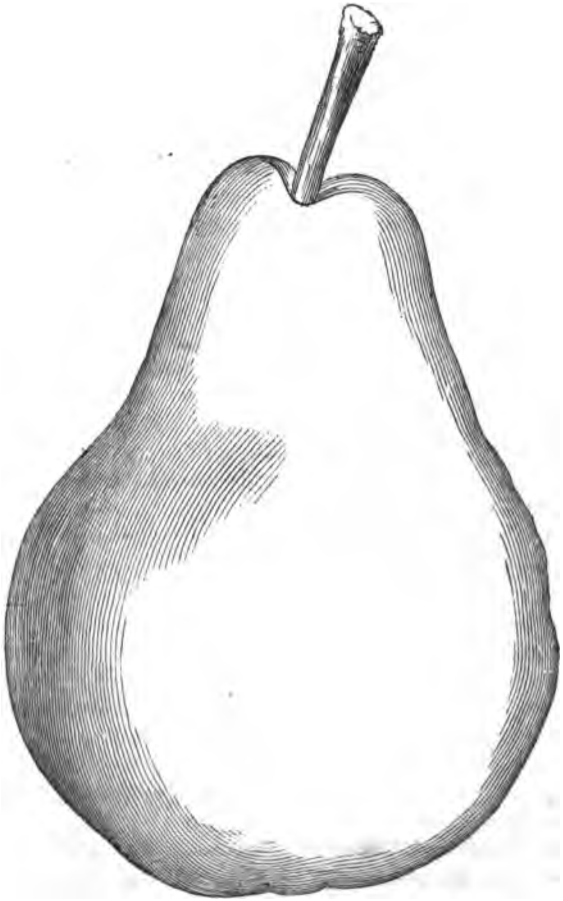
Williams. | Williams' Bon Chrétien.

FIRST TO FIFTEENTH SEPTEMBER.

While this beautiful and excellent fruit is not allowed by amateurs to take the first rank, it possesses qualities which have secured to it high esteem, and have made it the most popular variety in this country, since the decline of the Vergalieu, and it is therefore to be recommended for profitable cultivation.

It was originally found in Berkshire, England, in 1770, and brought to Roxbury, Mass., in 1797, under the name of Williams' Bon Chrétien.

Fig. 66.



Both in France and England it was but little esteemed, and it affords a striking instance of the fallibility of any standard of taste; for, while many consider it unsurpassed, not a few regard it as inferior.

The chief difficulty in growing it results from its precocious and too abundant fruitfulness. The tree coming into bearing at four or five years from the bud on its own roots, is often the first time so overloaded with fruit, that its growth is checked for several years, and thus it fails to attain fair size in many years.

On the Quince, the Bartlett is the most objectionable variety on our catalogue. It grows vigorously for two or three years, till fruiting commences, and then, if it bears abundantly, it perishes soon after; and even if carefully managed, and fruit-thinned, it rarely attains to a vigorous condition. The natural growth of the Bartlett, unchecked by fruit-bearing, is strong and vigorous; the shoots exhibit a peculiar equality of size throughout their entire length, ending abruptly and bluntly.

As a market pear, it has no superior, taking into consideration all its qualities—its early bearing, its great productiveness, and regularity, the fair size and bright lemon tint of its fruit, its melting, buttery flavor, and its universal popularity. The fruit possesses a peculiar musky aroma, which somewhat affects the taste. The pears exhibit a remarkable uniformity of excellence. There is not that inequality in the product of a tree, that is found in some varieties—a part very good and a part very poor.

The fruit may be picked when quite green and hard, transported long distances without injury, and still ripen with perfect flavor and high color. The Bartlett has, however, some defects. It is more subject to blight than most other varieties—a consequence of its strong, succulent, protracted growth. It cannot be grown on the Quince with success. Its fruit ripens when other fruit is most abundant; all the late summer and early autumn fruits disputing the market with it. But it has the advantage of producing good crops every year.

The French make it succeed much better than others on the Quince, and they propagate it on that stock largely. Having a large number grown on the Quince sent me one spring from France, by mistake, I planted one hundred and fifty—then ordinary-sized nursery trees—closely together, and allowed them to fruit the next year. They produced thirteen bushels of handsome fruit, which I thought compensated for the death of half of the trees the next season.

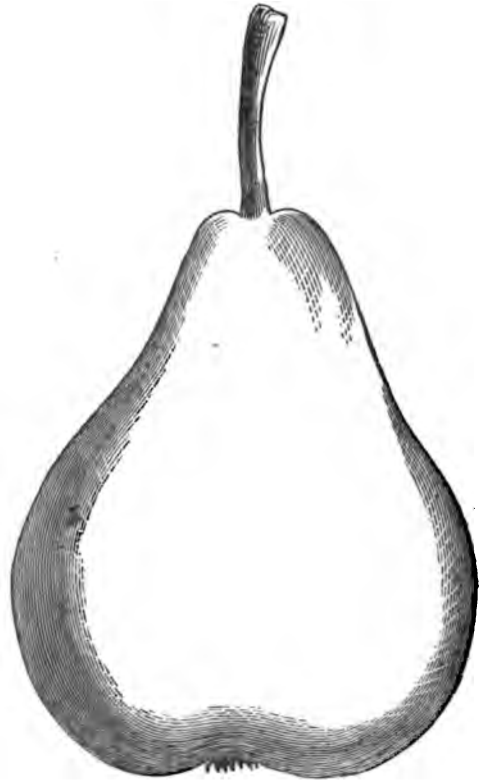
Belle Épine Dumas.

Épine Dumas.
Dumas.
Du Rachois.

Dumas de Rochefort.
" de Limoges.
" de Rochechouait.

OCTOBER.

Fig. 67.



This pear, when more fully known, must attain a very great popularity. Its great beauty is only equalled by its excellence. The tree is vigorous, hardy, and productive, and has the remarkable peculiarity of producing its fruit in the centre around the body, seldom bearing on wood less than three years old.

The fruit is of medium size, obovate pyriform, very smooth-skinned, and free from stain or rust, ripening to a light, but rich greenish yellow, and full of a sparkling, champagne-flavored juice, melting, but not quite buttery.

The number of its synonyms is indicative of its wide-spread reputation in Europe, and we believe it will excel in this country, as it is one of the very few varieties that have improved by immigration.

On the Quince, it is a stocky, vigorous grower, but forms the weakest union of all the varieties, not excepting the Bartlett. The pear-stock is decidedly preferable for this variety. I have not been able to detect any great change in the flavor produced by growing on Quince, but it thus comes earlier to bearing, and is more productive while young.

BELLE LUCRATIVE.

Bergamotte Luc.
Beurré Luc.
Bergamotte Flévée.
Seigneur d'Esperin.
Fondante d'Automne.
Groseillière.

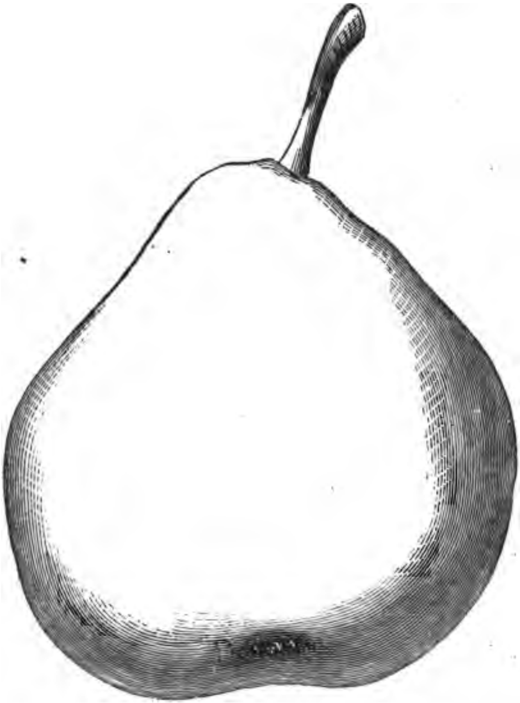
OCTOBER.

A prolific variety, of great beauty, and of such excellence of flavor as to obtain the highest praise from all pomologists. The beauty of the fruit, well exposed to the sun, excites extravagant admiration. The rich gold ground is irregularly mottled and striped with red and purplish shades. The fruit, somewhat variable, has a mean size, about equal to the Virgalieu; its shape is uniformly roundish obovate, quite broad at base in proportion to its height. The calyx is rather small, set in a broad, shallow basin; the stem is little more than an inch in length, stout, often fleshy.

I think this fruit combines the highest excellences of flavor and texture. It is entirely melting, with a sugary, vinous flavor, and most abundant juice, a thin skin, and small core.

Some pomologists complain of its slow growth and unhealthiness on the Quince; but when properly treated, I have been abundantly satisfied with its vigor and healthfulness.

Fig. 68.



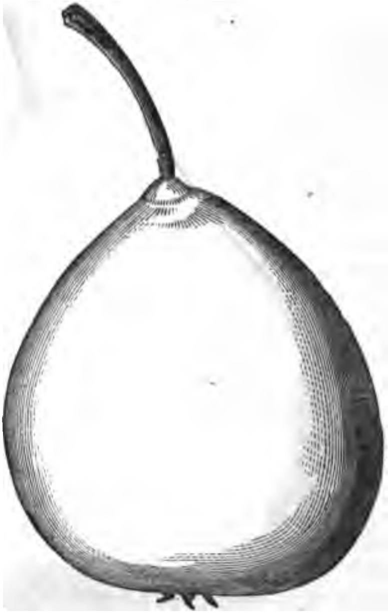
The fruit is borne in clusters, the tree is very productive, thinning being often necessary to prevent injury from over-bearing.

Bloodgood.

LAST OF JULY.

This variety originated on Long Island, and was named from the proprietor of the Bloodgood Nurseries, and considered by him a seedling.

Fig. 69.



It is the most generally liked and cultivated of the early pears, being one of the very few that have high flavor. Some, however, give a higher place to the Julienne, the Rostiezer, and Dearborn's Seedling; but, after a comparison of the excellences of all, I consider the Bloodgood the most profitable market early pear. The tree is vigorous and hardy, of a peculiar stout, fine-looking growth, with short joints, and a reddish brown color. It comes into bearing early, and is productive.

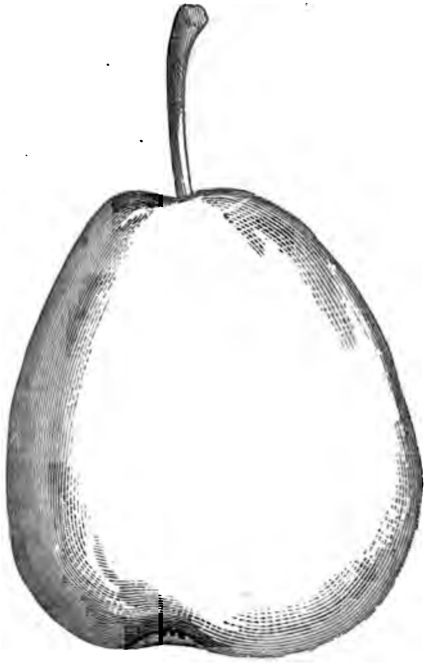
The fruit must be gathered before ripening, and matured under cover. It is small, and of a thick turbinate form. The skin becomes yellow in ripening, with russet on one side. Stem moderately long, curved, slender, and brown, the flesh extending up upon it. It is quite melting when well ripened, with the most perfumed and aromatic flavor of all early pears.

BUFFAM.

OCTOBER.

It seems unaccountable, that so valuable a variety as this should be so much neglected. I am acquainted with an orchard of this fruit that has borne regularly for more than twenty years, yielding enormous crops.

Fig. 70.



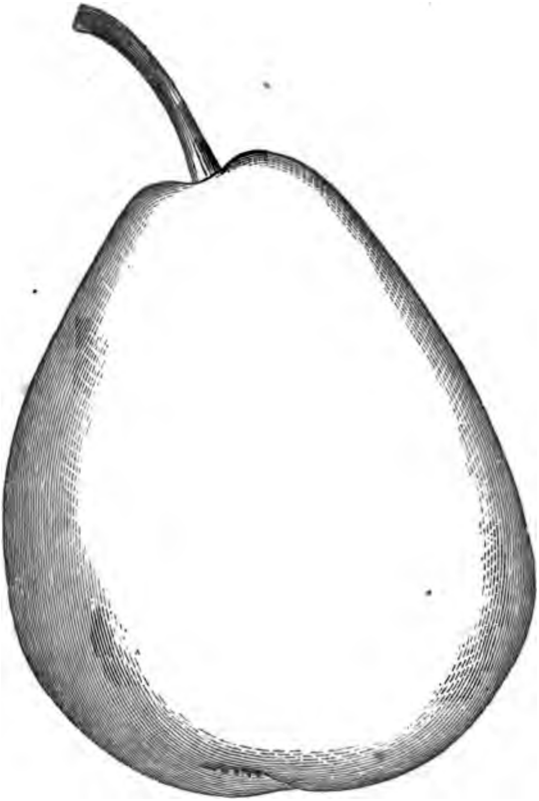
This variety is native of Rhode Island; it has a characteristic, upright growth, the branches shooting up almost parallel with the body.

The fruit is beautiful, on one side of a dull red, shading to yellowish green on the other; ordinarily, somewhat smaller than the Vergalieu, — but when thinned, of equal size, growing in long, rope-like clusters; and when in perfection, delicious with abundant sweet juice, peculiarly aromatic—often as good, I think, as the Seckel or Vergalieu, but tending to mealiness when over-ripe.

COLUMBIA.

NOVEMBER TO JANUARY.

Fig. 71.



This variety originated in Westchester County, N. Y. Supposed to be from seedlings planted by the French Huguenots. Its growth is upright, not unlike the Dix, shoots strong and vigorous, of a yellowish brown. The tree is hardy, grows rapidly, and is very productive. On account of the long slim stem, and the weight of the pears, they are liable to be blown off, before maturing, by high winds. The trees should, consequently, be trained low.

The fruit is large, obovate pyriform, but broadest in the centre. The skin is quite smooth, of a dusky green before ripening, afterwards of a greenish yellow, and often golden. Stem set somewhat to one side.

The fruit is very juicy, of rich, pleasant flavor, when well ripened—requiring less care in ripening than most others, and although not melting, and often coarse, is still one of the best market varieties. Its keeping qualities constitute an important excellence. I have seen this fruit in the windows of fruit-shops as late as the middle of January, ripening up to nearly first-rate flavor without care.

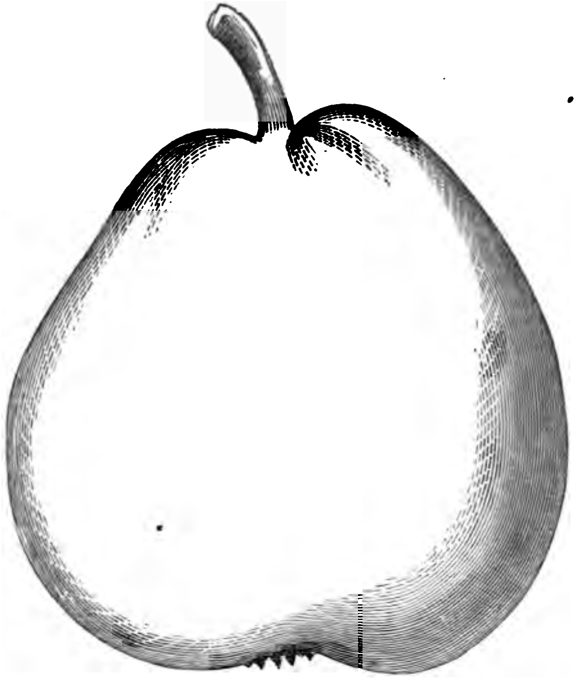
It is a favorite with marketmen, on account of remaining so long in perfection, its freedom from rot, its fair skin, and the high price obtained for it near the holidays. At that season, it is often sold for two dollars per dozen. While there are many winter pears of higher quality, the Columbia has hitherto stood the strong test of pecuniary profit, under which better fruits have entirely failed.

DOYENNÉ BOUSSOUCK.

Double Philippe. | Nouvelle Boussouck
Beurré de Misode | New Boussouck

OCTOBER.

Fig. 72.



This variety, imported from France by WM. KENRICK in 1841, has attained a high rank, and promises to fill, in some measure, the gap caused by the failure of the Vergalieu.

It is a strong and healthy grower, but not one of the most vigorous. It is, however, a most constant bearer, and very productive. It succeeds well on the Quince; but its flavor is not much improved by it, as far as my experience extends; and as it is an early bearer on the Pear, it is not of great advantage to grow it on the former. The fruit resembles the Vergalieu in form and color, acquiring a bright lemon yellow, often with a fine blush. It is considerably larger than the Vergalieu.

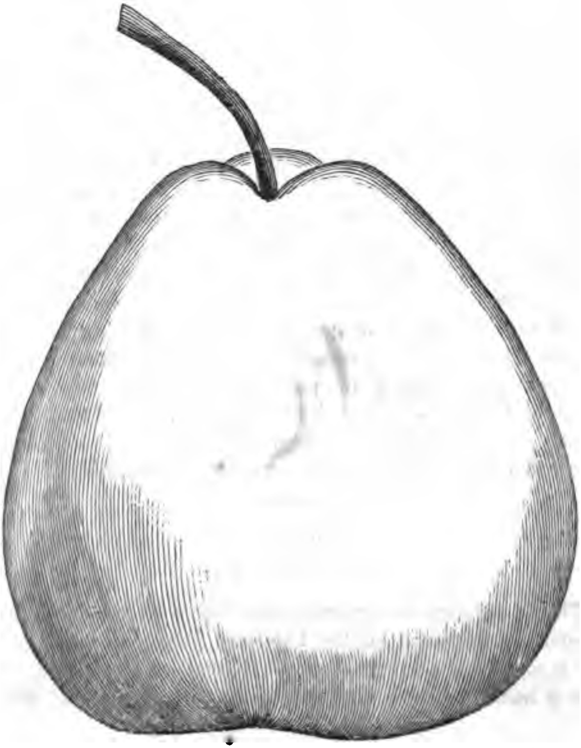
The skin is somewhat rough, occasionally, and the form often slightly irregular, like the Duchesse. Flesh, buttery, very juicy, and of high flavor; texture sometimes a little coarse.

FLEMISH BEAUTY.

Fondante des Bois.
Beurré des Bois.
Beurré Spence.
Belle de Flanders.
Bergamotte de Flanders.
Impératrice de France.

LATE SEPTEMBER TO MIDDLE OCTOBER.

Fig. 73.



The merits of this variety are: a strong, luxuriant growth, beautiful shape, forming a perfect, but rather open, pyramid, with but little shortening in; fruit of large size and fine shape, beautiful color, melting texture, rich honeyed flavor, perfumed aroma, and great abundance of juice—thus being one of the most luscious and agreeable of fruits.

It decays, however, soon after ripening, and cannot be left on the tree as long as most others. It requires to be gathered before the stem will readily cleave from the spur, and while quite tasteless and hard.

The fruit is very regularly obovate; skin, a dark green, changing to pale yellow on one side, with often a crimson blush, and to rich russet on the other. Stem slender, about one inch long, set in very regular but shallow cavity. This variety requires a good and deep soil, without which it is apt to be inferior, and shy of bearing. Contrary to the experience of some, I have found this variety grows well on the Quince, and I have none that excels it in luxuriance and in beauty of shape without pruning. It has not, however, reached an age to sufficiently prove its productiveness.

This Pear is a great favorite with pomologists. It occupies a preeminent place at most horticultural exhibitions. Specimens are often exhibited measuring thirteen to fifteen inches in circumference, weighing a pound and upwards, of great beauty of form and color. The shape of this Pear varies less than any other variety. Dr. GRANT, an eminent horticulturist, gathered from a tree, eight years planted, 400 pears, which sold for $30.

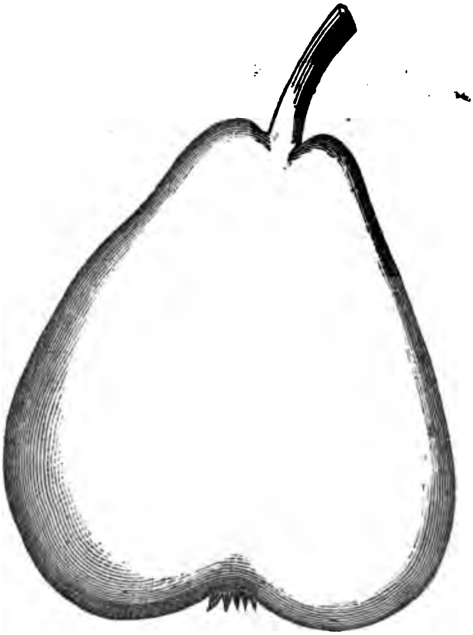
At the Exhibition for 1857, of the Massachusetts Horticultural Society, the specimens of Flemish Beauty shown would average larger than those exhibited of the Duchesse d'Angoulême.

LAWRENCE.

DECEMBER.

This is a native variety, and ranks high with almost all cultivators. It originated on the Lawrence Farm, Flushing, L. I., and is considered a hybrid of the St. Germain and Vergalieu. The tree is hardy, tolerably vigorous, handsomely shaped, and with a little pains in pruning, acquires a very regular conical form. A characteristic of its growth is, that the branches grow nearly at right angles to the stem, and often nearly opposite to each other, giving an open head and regular shape. The wood is not stout, nor yet slender; it is of a pale brown with a slight yellowish shade, occasionally armed with imperfect thorns. This variety is remarkably free from diseases and defects. I have never known an instance of blight or of cracking of the bark, or of that obstinate refusal to bear sometimes met with in other kinds.

No. 74.



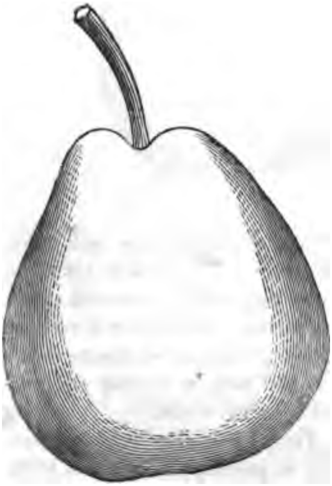
The fruit much resembles the Vergalieu in size, and in appearance when ripe, though not quite so golden; but its rich, juicy, aromatic flavor, melting and buttery texture, rival that famous pear in its perfection. It is peculiarly adapted either to late keeping or early ripening, according as it is differently treated—being capable of being brought to perfection any time between Nov. 1st and March 1st. This much increases its value as a market pear. It brings the highest prices, and is much sought for by fruit dealers. Messrs. Ferris & Wolfe, of Throg's Neck, cultivate it in large quantities, and great perfection, equalling the best Vergalieus in size, and some specimens much excelling them.

SECKEL.

FIRST SEPTEMBER TO FIRST NOVEMBER.

This variety has won and retained the highest popularity, in spite of the inferior size of its fruit, its slow growth, and its tardiness in coming into bearing. It is the smallest of the pears that hold any place in popular esteem, and the trees on pear-stocks, without extra treatment, are often fifteen years in producing their first fruit.

No. 75.



This variety originated near Philadelphia, and was a chance seedling. Some European Pomologists have pronounced it the most highly flavored of all pears, in which opinion I by no means concur. Its flavor is so sweet as to be sickening to many, and it lacks the highest essentials of sparkling, sprightly juice.

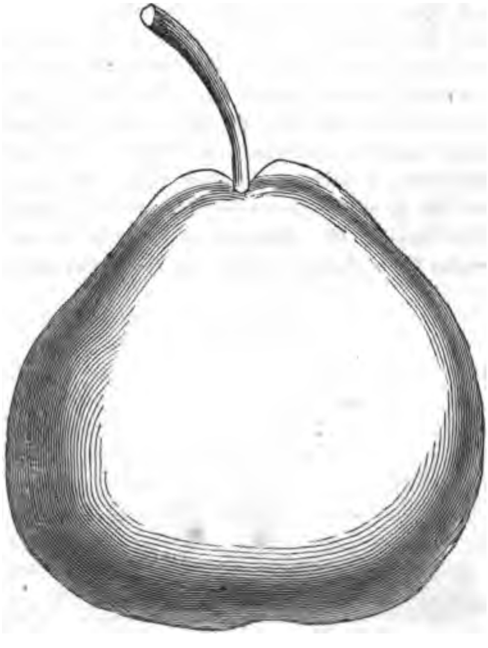
The tree is hardy, and every where free from blight, even where all others are affected. It is trained to a pyramidal form easily, without much pruning. The wood is short-jointed, rather stout, of an olive brown. The fruit is obovate, brownish green at first, changing to a dull yellow, with a reddish russet cheek; stem not very long; calyx set in a very shallow basin. It has the merit of long keeping, while ripe, and may be ripened any time during September and October. In collections, I would advise to plant a few Seckels on Quince, for trial. It has a tendency to overbear, when of considerable age, and, in consequence, the fruit becomes very small.

WINTER NELIS.

Bonne de Malines.
Nellis d'Hiver.
Colmar Nelis.
Beurré de Malines.

DECEMBER.

Fig. 76.



I am decidedly of the opinion that there is no Pear which excels this in all the good qualities of a fruit. There are but two defects, and these are not serious. Its appearance is uninviting, much resembling a russet apple, and the tree is a straggling, irregular grower, its shoots being thin, twining, and sparsely set. Accordingly, nurserymen sometimes work it high up, on some free growing variety, to form standards; but I have found no difficulty in forming tolerably-shaped pyramids by summer pruning.

It is hardy, with tough, close-grained wood, enabling it to endure extremes; is a moderately rapid grower, comes into bearing early, and is very productive; has an open habit unless shortened in; leaves small; wood of a light yellowish brown.

It has been much condemned on the Quince, and I think somewhat unjustly. I have found that, on this stock, it makes a vigorous growth, a very firm union, and fruits well.

The fruit is of medium size, and in the most favorable conditions quite large; is of a light grayish russet; roundish, apple-shaped; melting, buttery, sweet, high flavored, and very juicy. To obtain it of large size, the fruit must be much thinned, as the tree is greatly inclined to overbearing. It grows in long clusters, resembling ropes of onions. It often ripens by the middle of November, but by care in preservation, may be kept until Christmas. This variety, Mr. DOWNING says, holds the same rank among winter fruits that the Seckel does among the autumn.

VARIETIES THAT MAY BE GROWN ON THE QUINCE.

In the first glow of satisfaction with which Pomologists received the announcement that the much-coveted pear, which demanded the care of two generations to witness its fruiting, could be grown successfully upon the Quince, every variety of pear was grown on every variety of quince, and the consequence was, a disappointment—whose reflux, for a few years, seemed to threaten the very existence of quince-rooted pear trees, and cause their extermination.

It has now become fairly settled, that while all varieties of Pear will exist upon the quince-root, but few will bear the test of the following rules, for growing the Pear upon that stock.

1. The variety must have such an affinity for the Quince, as to grow equally well upon it and the pear-root—which can only be known by extensive experiments, by persons in different localities.

2. The sort of pear must be very considerably earlier in coming into bearing than upon its own roots—in the case of the Bartlett, but little would be gained by its possessing an affinity with the Quince, as it is sufficiently precocious in its fruiting to dwarf the tree on its own stock.

3. The Pear should be somewhat improved in size, flavor, and perhaps, in some varieties, in productiveness.

When all of these conditions are fulfilled, it will be found that comparatively few varieties imperatively demand the quince-stock for their perfection. At the same time, almost all can be grown upon it, by complying with the conditions for their treatment, in planting, cultivation, and fruiting, viz.:

To bury the Quince some inches below the surface.

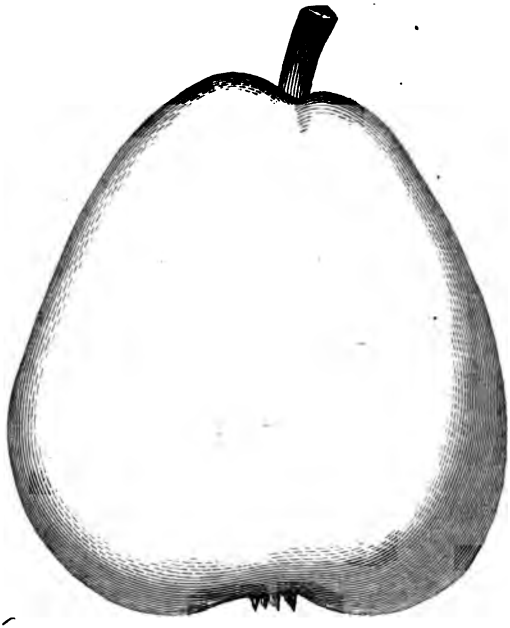
To cultivate the ground thoroughly, and supply sufficient nourishment; and

To carefully prevent overbearing when very young.

Beurre d'Anjou.

Nec Plus Meuris.	Ne Plus Meuris.

Fig. 77.



For this noble Pear, we are indebted to Col. Marshall P. Wilder, who imported it from France. Notwithstanding the high claims made for it by him, it has not only met, but promises to exceed our expectations of it. Nothing could be finer than the sight of the specimen trees, ten or twelve years old, in Col. Wilder's ground, loaded with large and fair fruit, as I saw them in the fall of 1857.

It is a most prolific bearer, and, from its size, late keeping, and the hardy growth of the tree, promises to become one of the best market fruits. Its period of ripening is usually assigned to October; but some specimens sent me by Mr. WILDER were sound, and not quite ripe, when cut on the 10th of December. I have, however, seen it ripen, for the most part, near the last of October to the middle of November.

The tree makes a peculiarly stout, upright growth, the branches of a dark, purplish brown, starting out from the trunk at a considerable angle, but immediately growing upright, and presenting the appearance of being nearly parallel with the main stem. The fruit is roundish obovate, often considerably larger, upon one side, and curving to the other, with a short, straightish stem. The flesh is quite yellowish, buttery, and with a very rich, sprightly, sub-acid flavor. The pear must be marked *best*.

BEURRÉ SUPERFIN.

OCTOBER—NOVEMBER.

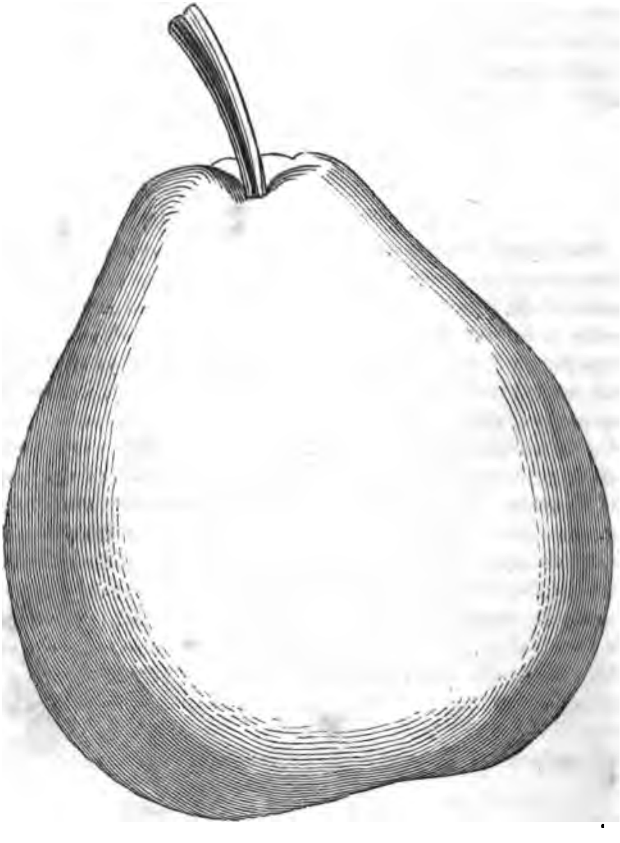
The Beurré Superfin is a beautiful Pear, of large size, which, although comparatively new, has received the unqualified approbation of all pomologists, as possessing all the nice requisites to entitle it to rank as first-rate. The tree is vigorous, and handsomely shaped, and quite early prolific on pear or quince-stock, and not liable to any of the serious qualifications which modify our praise of other varieties. The fruit, when fit for gathering, is of a deep pea-green, resembling the Glout Moreeau; and though ordinarily ripe late in October, with care will keep to the first of December. When ripening, it changes to a rich yellow, and has the rather uncommon virtue of remaining in a condition of excellence for several days after ripening. It is of the most buttery, melting texture, and the abundance of rich, sugary juice, is a constant source of surprise. It is very regular and constant in its shape, of a slightly turbinate and obovate shape. This pear will undoubtedly attain a high popularity, to which the hardiness, productiveness, and beauty of the tree, and the excellence of the fruit, richly entitle it.

It originated at Angers, in the grounds of M. GOUBALT.

Beurré Diel.

Beurré Royal,
Beurré Melon,
Beurré Magnifique,
Beurré Incomparable,
Buerré de Trois Tours,
Beurré Melonde de Kops,
Celeste,
Dillon,
Florimond,
Dorothée Royal,
Diel,
Gros Dillon.

Fig. 78.



This noble Pear is one of the few hardy and profitable varieties produced by artificial cultivation or design. It is a seedling of Van Mons, named in honor of his friend, Dr. Diel; and will preserve the memory of the latter longer than any act of his own busy and honorable life. It is one of the most vigorous varieties in its growth, and is perfectly successful on the Quince; and like the Duchesse, its flavor is greatly improved by that stock. On pear-roots, or when grown on cold soils, or while the trees are very young, the fruit is apt to be astringent and coarse; and I have known excellent cultivators, unaware of its demands, to regraft the Diel trees with inferior varieties. While young, it is a shy bearer; and when in full bearing, the fruit is so regularly distributed through the tree that thinning is seldom necessary. The fruit is abundant in juice, of rich sub-acid flavor, half-melting, somewhat coarse-grained near the core. The skin is thick, and somewhat astringent, and should be removed before the fruit is eaten. It is obtuse pyriform in shape, of a russet lemon yellow; stem a little more than an inch long. Its period of ripening may be prolonged from 1st October to December by picking early, and packing in close boxes in dry, cool rooms. It needs more care in ripening than some others. The shoots are a dark brown, tinged with gray; inclined to twist with abrupt curves. Vigorous pruning is necessary to produce well-shaped pyramids.

In the grounds of Mr. Winchester, of New Haven, trees of this variety, six or seven years old, which were models of beauty in shape, produced a crop of fruit in 1856, of which very few specimens weighed less than fourteen ounces, and a considerable number more than a pound.

At one of the Massachusetts Horticultural Exhibitions, twelve Beurré Diel Pears were shown which weighed fourteen pounds; and Mr. Barry exhibited four of the same variety, raised in Iowa, which weighed nearly five pounds.

DUCHESSE D'ANGOULEME.

Des Eparronais. | Bezenas.

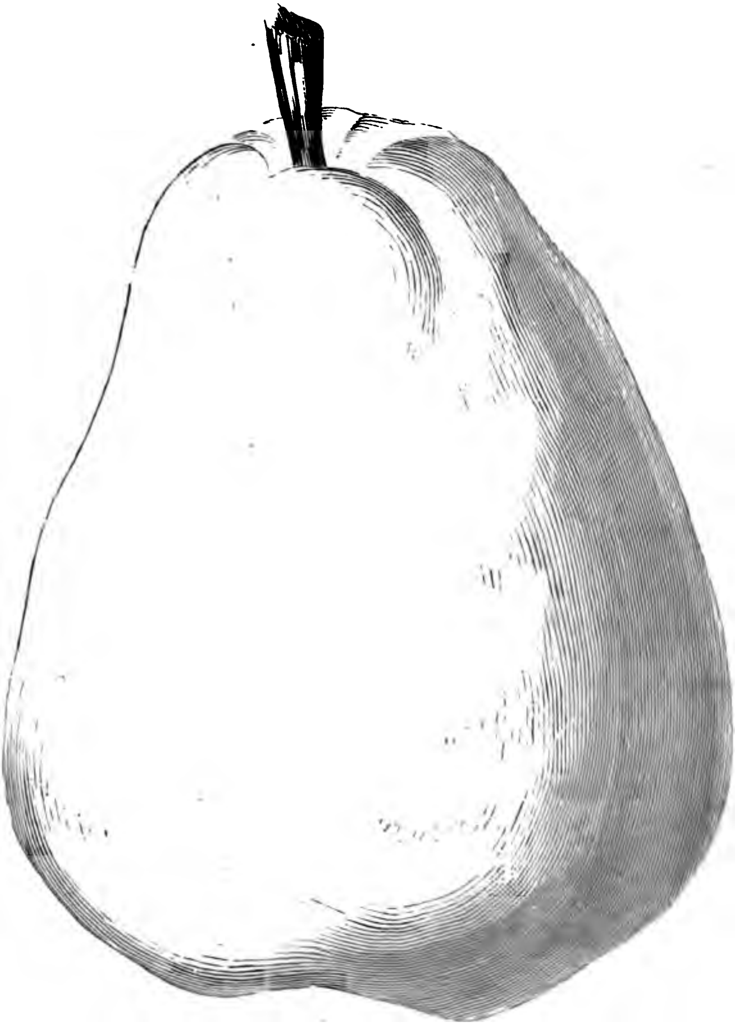
FIRST OCTOBER TO FIFTEENTH NOVEMBER.

This peerless fruit must be crowned as The Queen of Pears. Like its patroness, the daughter of the unfortunate Louis XVI., it was by narrow chances it escaped the axe. Near Angers, Mons. LE BARON —— one morning discovered his tenant engaged in digging around a fine thrifty pear tree—a chance seedling in a hedge—and on questioning, the Baron found it was for the purpose of exterminating it, root and branch. "This tree, Mons. Le BARON, for twenty years bears no fruit." "No matter," replied Mons., "it is a good thing, to have cut those roots there; it will now bear fruit; fill up the trench, and we shall see." This rough root-pruning fulfilled the wise Baron's prophecy, and the succeeding summer saw it loaded with that queen of fruits. But though royal, the beautiful Pear was still uncrowned.

One day, the daughter of Louis XVI., was to pass through Lyons, and its inhabitants deputed a Committee, of which our friend Mons. LE ROY was one, to receive her appropriately. Nine fair maidens presented the Duchesse with golden salvers, on which lay heaped the more precious fruit, and begged her to bestow upon it her name—and the pear now recognized as the crowning glory of all fruits, was thenceforward known as the Duchesse d'Angoulême. There are some who think the pear the more royal of the two.

It is by far the largest of table-fruits; of rich, aromatic flavor; melting, though tending to a coarse fibre, near the core, when badly grown and ripened. Very juicy, and keeping long after being sufficiently ripe to eat.

The tree is somewhat tender in very cold winters where the thermometer sinks to 20° or more below zero; but hardy and strong wooded, and very thrifty, stocky growth on soils of moderate fertility, and prefers a rich, sandy loam to produce its highest excellence. The fruit is often coarse and tasteless on the pear-stock: but both tree and fruit seem the most completely fitted for



DUCHESSE D'ANGOULEME.

the quince-stock of all pears. Grown on this, the size is vastly increased, the flavor and texture improved, and the low structure prevents these great fruits from being blown off, while the bud unites with the quince-stock with so great firmness, that few trees of this variety ever fracture at the graft, and all seem to grow with as much vigor as on the pear stock. It must be said, however, that, like other royal personages, it does not produce great numbers of fruit, at least when young, though I have often seen on rich soils, trees loaded as heavily as any other variety. The fruit must be well thinned, the tree severely pruned, and the soil rich. The wood is of a light yellow, tending to a reddish bloom on the sunny side of the young growth. The tree is not very regular in its shape, but endures severe pruning well.

Specimens of this Pear, weighing two pounds and a half, have been produced in California; and one which weighed two and a quarter pounds was raised by Dr. WARD, of Newark, N. J. It is one of the most profitable market varieties, the largest fruits selling from two shillings to a dollar each, in the shops of Broadway. I have picked Duchesse weighing twenty-one ounces, from trees received from France in the preceding spring, or seven months previously.

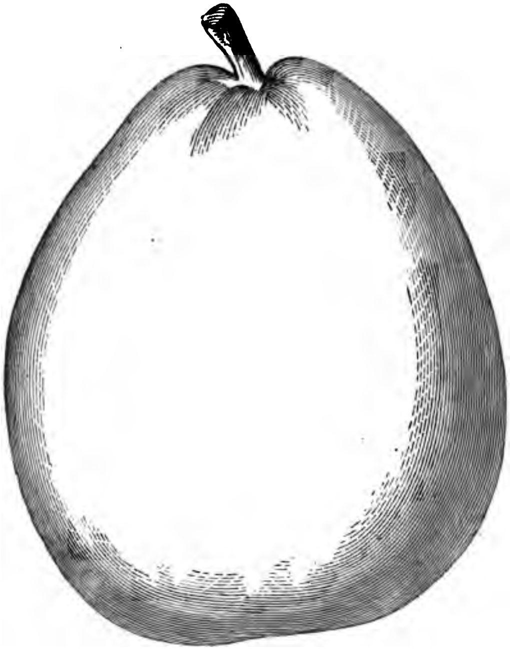
EASTER BEURRÉ.

Doyenné d'Hiver,	Doyenné de Printemps,
Belle d'Ixelles,	Seigneur d'Hiver,
Berg. de la Penticôte,	Winter Beurré,

Beurré d'Austerlitz.

MARCH AND APRIL.

Fig. 79.



This late keeping, but rather inconstant fruit, has of late years received extraordinary attention. It is imported in considerable quantities every spring by the fruit-sellers, who obtain in March and April enormous prices for it. It has thus far proved quite uncertain in this country, but as far as I can learn, its failure is the result of neglect of thinning and improper treatment in ripening. The French greatly excel us in both these processes, and the imported pears of this variety are almost invariably fine.

It should be understood and remembered that winter pears must acquire a stock of more concentrated juice than the autumn or summer varieties; the sap must be richer in the sugar-producing principle, and if more fruit is left on the tree than the roots and leaves can supply with the necessary elements, the consequence is apparent. Second, that all the juice contained in the fruit at the time of picking, is necessary to complete the chemical change of ripening, so that, in proportion as the fruit loses its water, its dry elements lose their power of uniting and producing a high flavor. From these facts, it will be perceived, that unless all the juice of a winter pear is preserved by artificial means, it will be impossible to ripen it with any degree of excellence, although the fruit is medium sized, seldom reaching ten ounces. It has been sold in New York as high as twelve dollars a dozen; but the more ordinary price for good specimens is three dollars per dozen. Its flesh is white, and very juicy, buttery, and melting, when well ripened. It is obtuse pyriform, often a little flattened, dark green, sometimes reddened on the cheek, and acquiring but a faint yellow in ripening. It requires a longer season than that of the Eastern States to come to highest perfection. Its season is March and April; occasionally May and June. The tree is a hardy, vigorous grower; bark, a peculiar reddish brown; shoots, stocky, tending to upright growth. It is well adapted to the Quince, on which it makes a strong growth, with much improved fruit.

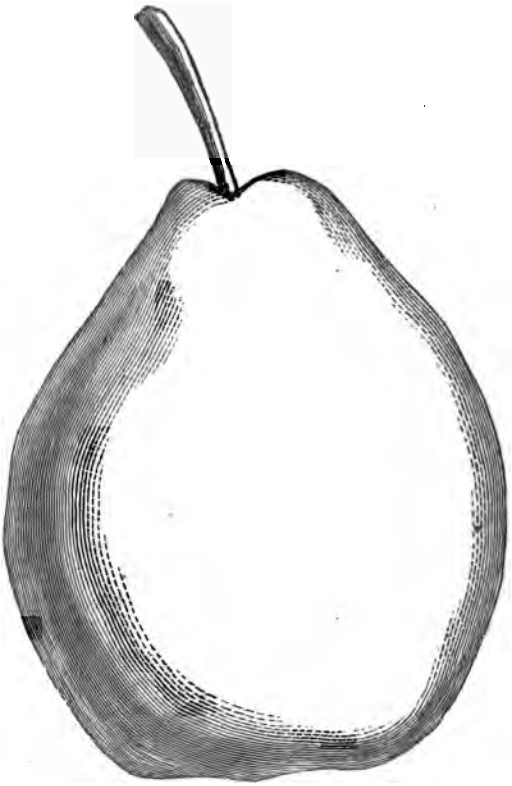
My recent experience is, that the Doyenné d'Alençon and Beurré d'Hiver Nouveau will prove greatly superior to this for general cultivation. But it is too early to speak decisively.

GLOUT MORCEAU.

Glout Morceau,	Beurré d'Hardenpont,
Colmar d'Hiver,	Beurré d'Aremberg (erroneously).

DECEMBER TO JANUARY.

Fig. 80.



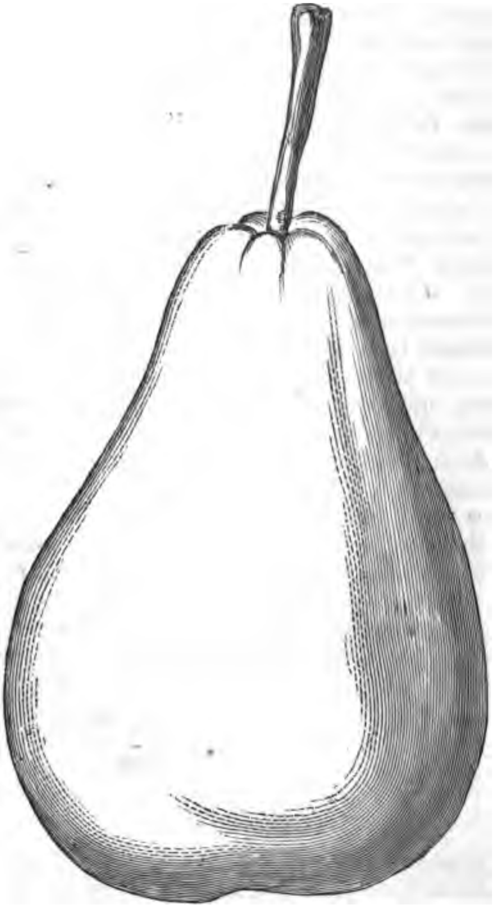
This excellent pear is of Flemish origin, its name signifying "greedy morsel," and though plain and unattractive in appearance, its nobler qualities make it a favorite whenever grown. Its reputation has sometimes suffered by being confounded with the Beurré d'Aremberg, a very inferior and dissimilar variety. I have often received it from France under the latter name. The d'Aremberg is feeble and tender in growth; shoots starting at acute angles from the stem, growing upright, of a light reddish tinge, and on the Quince, the growth is still poorer, and the union imperfect and feeble. Its fruit is of pyramidal shape, stem short, stout, fleshy, a little curved, size seldom half that of the Glout Morceau. Color quite yellow, even while hard and on the tree. But the Glout Morceau is in every particular dissimilar, but in no respect more so than in the growth and vigor of the tree, which is a very vigorous grower, making a handsome pyramid; and though said to be somewhat subject to the blight, has not proved so on the quince stock. The wood is of a light brown, clouded with a grayish tinge. It is not very prolific, while young, but quite so, when more advanced, the fruit being uniformly of good size. It is peculiarly adapted to the Quince, the growth being equal to that on the Pear, and the fruit much improved. The fruit is of a deep pea-green, until it matures, when it becomes of a greenish yellow, with patches of brown russet. The fruit has a rich, sugary perfumed flavor, is melting and buttery, and keeps late, flesh colorless and fine-grained.

In the fall of 1857, I saw in the garden of Mr. VAN DINE, at Cambridge, Mass., a tree of this variety, on which, it was estimated, were growing from eighty to one hundred dozen of fine pears, such as Mr. VAN DINE had for several years sold in Boston for two and three dollars per dozen. The tree is very tardy in bearing; and is, therefore, one of those varieties for which the quince-stock is peculiarly valuable.

LOUISE BONNE DE JERSEY.

Louise Bonne d'Avranches, | Bonne Louise d'Avranches,
William the Fourth.

Fig. 81.



Some discrepancy of the authorities in regard to the names of this variety, have produced a little embarrassment. M. CAPPE pronounces the Louise Bonne d'Avranches quite distinct, in which decision Mr. DOWNING, in an account of his visit to Paris, coincided; but in his fruit-book he gives the names as synonyms.

It is a native of the Isle of Jersey, where it is produced in higher excellence than elsewhere.

It has an upright habit of growth, is easily distinguished by its dark purplish shoots, a little flecked with light grayish spots. On the Quince, it is an abundant and early bearer, and its flavor is much improved on that stock. When, however, the trees of this variety on the pear-stock have attained considerable age, there does not seem to be much difference in quality between the fruits grown on both stocks. When it is allowed to fruit too heavily, or when grown on very young trees on pear-stocks, there is a tendency to astringency, especially in the skin. On the Quince, it does not readily take the pyramid form, its prolific nature crowding the wood-buds into fruit-buds, causing a deficiency of branches. To fill out the cone, it must be more heavily cut back than other kinds, to force the dormant buds to push, and form radial branches. The fruit should be very much thinned, as much more will set than can be perfected.

The fruit should be picked as soon as the stem will cleave without breaking, as its astringency is increased by ripening on the tree. This pear is the most abundant in sprightly, subacid, champagne-flavored juice, of all pears. Its thick skin materially serves to retain this juice, retarding evaporation; and although considered by some an objection, it is essential in preserving the excellence of the fruit. The fruit is often of a beautiful crimson color on the sunny side.

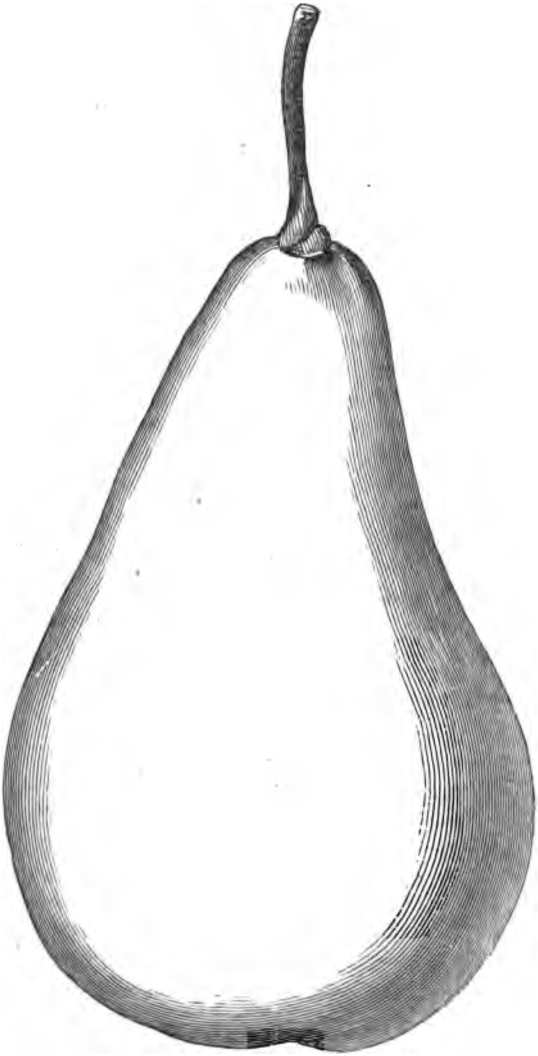
VICAR OF WINKFIELD.

Curé,
Monsieur le Curé.
Belle de Berri,
Comill de Toulon,
Belle Adrienne,
Belle Heloïse Cilon.

DECEMBER.

While this fruit has few of the high qualities that amateurs now require from a pear, to place it in the first rank, it has still such valuable properties that it must receive attention. As a market fruit, there is none which, I think, when all its qualifications are taken into consideration, will have a higher value. The tree is very hardy, and probably the most vigorous grower of all pears, making very stout, curving, and stocky shoots. It comes quite early into bearing, and has the uncommon fault of maturing twice the number of fruits which the tree should bear, without much lessening the quantity borne in succeeding years, or checking entirely its growth. When the fruit is thinned to one-fourth, or one-half, the pears reach a very large size, and are much improved in flavor; but when small, the fruit is astringent, hard, and seldom ripening so as to be eatable. The first requisites in the treatment of this fruit are, thinning to the number which will become full grown, and continuing it upon the tree as late as safety from frosts will allow. Mr. SAMUEL WALKER and Col. WILDER esteem this fruit so highly, that they were heard to say, many years ago, that should they be confined in their choice to a single variety, they would strongly incline to select the Vicar; and at the last Pomological Convention, stated that their more recent experience confirmed their earlier belief. Its hardiness, great vigor, early prolific, and constant bearing—its large size, fine shape, rich color, and late keeping, overcome the serious objections to it which would condemn any other fruit. It is never melting, nor high flavored, though richly perfumed, is often astringent when not well grown, and when eaten too ripe, is mealy and dry. But when just ripe, it is crisp and tender, with an over-abundance of juice, of a pleasant acid flavor, which is particularly grateful, as being enjoyed during the season when autumn fruits are long gone, and winter fruits not yet ripened. But it is absolutely necessary that the following

Fig. 82.



conditions must be fulfilled. Large size must be obtained by thinning, to concentrate the saccharine matter of the tree into few fruits; the pears should be allowed to hang late on the tree; should be at once removed to a cool room; should be brought out but few at once to ripen, and should always be eaten before becoming sufficiently soft to be easily indented by the thumb and finger.

Mr. WILLIAM HOWE, of Westchester County, has excelled most others in the production of this pear. I received from him, in the Fall of 1856, Vicars weighing seventeen ounces, and of beautiful shape and color. But these were far excelled by a specimen received from Oregon, which weighed twenty-eight ounces. A tree of this variety, five years planted, from the nursery row, grown by Prof. MAPES, was exhibited at the American Institute Fair, bearing one hundred and seventy fair-sized pears, far too many to arrive at the highest perfection. The fruit is large, curved pyriform, with neck much elongated, and continued up upon the stem, which is curved, and has flesh around its base.

When placed in the sun, a day or two before ripening, it acquires a rich golden or lemon-yellow color. It is greatly improved by growing on the Quince, on which it makes a strong, vigorous growth, and a firm union, and proving most perfectly adapted to it in every respect. On deep alluvial, or rich and damp clay soils, it is somewhat subject to blight.

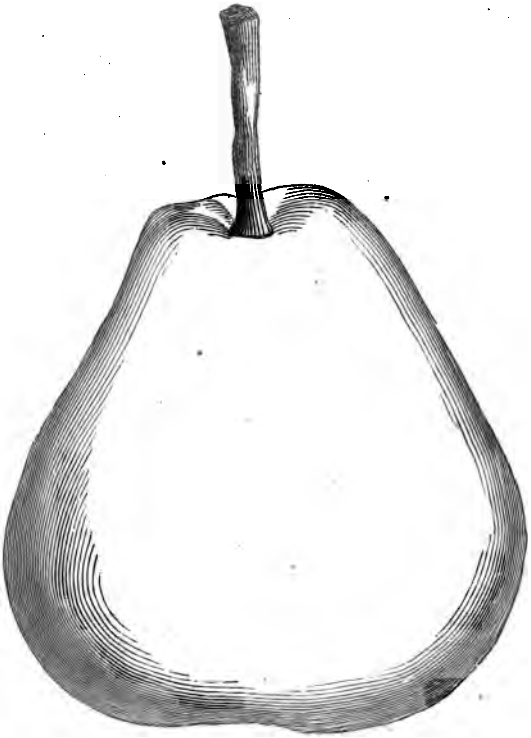
URBANISTE.

Beurré Piquery,
Louise d'Orleans,
Beurré Drapier,
Count Colonna,
St. Mark.

OCTOBER—NOVEMBER.

This excellent and beautiful pear is a favorite wherever it has fruited; but the tree is so tardy in bearing, that comparatively few have proved its excellence. The natural beauty of the tree is unequalled, as it takes a stout pyramidal shape with scarcely any pruning, the cone being rapidly filled out with numerous branches that describe a graceful curve. The hardiness and tardy bearing of the tree give promise to it of great longevity. The fruit is but little above the medium size; but its great excellence and freedom from disease or blemish entitle it to the highest rank. It is so tardy in bearing upon the pear-stock, that it would be a misfortune if it had proved unfitted for the Quince. It makes a firm union and vigorous growth upon that stock, and bears eight or ten years earlier than on pear-roots.

Fig. 83.



Col. **Wilder** says, that he has trees of this variety on both stocks, twenty feet in height, planted twenty years; and that while those on quince-roots have borne twelve years, those on pear-stock have scarcely produced a specimen fruit. From each of those on quince, two or three bushels of pears have been gathered in a single season.

The fruit is delicious in flavor, highly perfumed, melting, and without any of those serious faults possessed by some varieties, such as rotting at the core, cracking, or cankering. The pear is very smooth, often glossy, ripening to a pale, greenish yellow, with light russet spots; form obovate, with slightly hollowing sides near the neck. It is very broad at the calyx end in proportion, with a wide, deep basing, stem long, and set in a deep hollow. The wood is of a peculiar light grayish color, without the shading or tinting of other varieties on the sunny side.

WHITE DOYENNÉ.

St. Michael.
Butter Pear.
Bergalo.
White Beurré.
Yellow Butter.
Doyenné
Virgalieu.
Poire de Simon.
Deans.
Snow Pear.
Pine Pear.
Poire Monsieur.
Valencia.
Doyenné Blanc.
Beurré Blanc.
Common Doyenné.
Kasserbrine.
Butterbrine.
White Autumn Beurré.
Warwick Bergamot.
Poire de Seigneur.

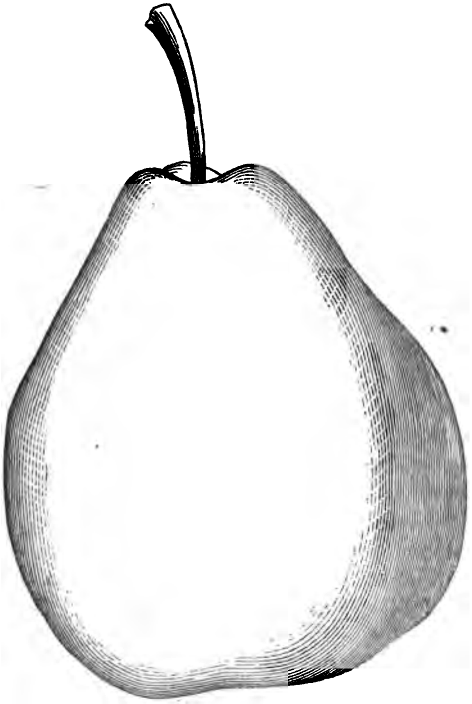
It is with some hesitation I admit this in the list; but its great excellence, abundant crops, and the hardiness of the tree, compel me to allow it a place, but with the sad qualification that it cannot be fruited in perfection, with any tolerable certainty, any where on the Atlantic Coast. It was Mr. DOWNING's opinion, that its failure was the result of the exhaustion of the alkaline salts of the soil. But this does not prove to be true, for the soil best supplied with these elements will no more produce perfect Vergalieus than the poorest soil. The tree grows vigorously, often loaded with fruit, which soon cankers, covered with a crust like burnt leather, cracking into irregular fissures, becoming totally unfit to eat.

On the Quince, however, it is often obtained of great excellence. But it has not been sufficiently tested to pronounce with certainty on its uniform success; and the tide of opinion latterly seems entirely opposed to it.

The disease manifests itself principally in the region of large bodies of water—the ocean and great lakes.

WHITE DOYENNÉ.

Fig. 84.



This fruit scarcely needs a description—it is of medium size, oblong obovate, becoming golden yellow in ripening, with a rich blush on one cheek. It is the very type by which all other Pears are compared in its melting, buttery texture, and abundant spiced and high-flavored juice.

The tree is vigorous, of rather upright growth; the yearling shoots of a yellowish cast, with a pale blush on sunny side; the older wood, of a slight reddish glow.

There are many seedlings of this variety that approach it in excellence.

ADDITIONAL LIST.

This second selection of pears is intended to include those having most of the properties requisite for the first list, but which are deficient in some important particular. Some are too new to be pronounced upon; some are equal to those of the first list in certain localities, but not in all; and generally, they possess too great excellence of flavor, size, and beauty, to be passed over.

They are all necessary to a complete amateur collection, and the market-fruit raiser should have at least specimens of every kind, to test their fitness for his locality. Any of these varieties may be pronounced *best*, when the cultivator has the soil and climate which bring them to their highest perfection, and they suffer no disparagement by being placed in this list; for they may, in localities adapted to them, prove superior to any in the first list. It must be remembered that this selection is made more according to a marketman's calculations of profit and loss, than an amateur's enthusiastic admiration.

Varieties proved to be adapted to the Quince, will be noted in the descriptions. Where nothing is stated in regard to the stock, it may be understood that the pear-stock is best for that variety, or that it is not sufficiently tested on the Quince.

Andrews.

SEPTEMBER.

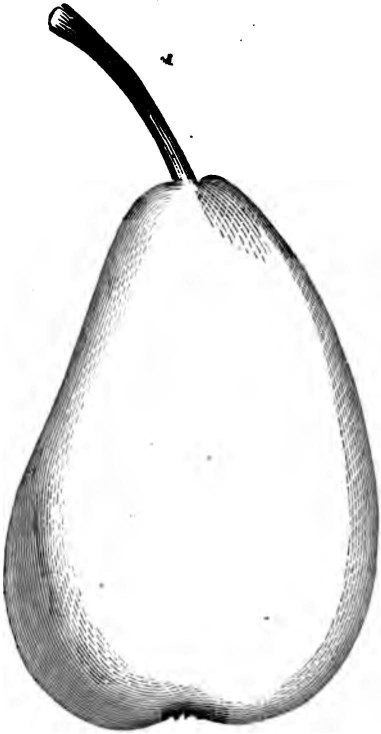
An excellent variety, as far as I have seen, proving a most hardy tree, a regular and early bearer. The fruit is said to rot occasionally at the core; I have never found it to do so. According to Mr. Downing, it never suffers from blight, and I believe does not on most soils. A large number received by me from a nursery located on a low, alluvial soil—in fact, a drained mill-pond bed—blighted badly. Some of my friends who have planted it, are disappointed in its flavor and general character. The fruit is long pyriform, shaped somewhat like the Bartlett, but smaller; with a yellowish green and reddish tinge on the cheek. Very juicy, melting, with a delicious sparkling flavor.

ANANAS D'ETÉ.

SEPTEMBER AND OCTOBER.

Fruit excellent, fine grained, buttery, melting, from medium size to large; abundant sugary juice, of rich flavor, and perfumed when perfect. Skin rough, coarse, — yellowish green, with large russet roughness flecked over it. Shape pyriform, tapering quite regularly to the stem, which is set without depression, is straight, and is of medium length. The fruit is very variable, and sometimes quite poor. Ripens in September and October, though termed by the French *Summer Pineapple.*

Fig. 85.



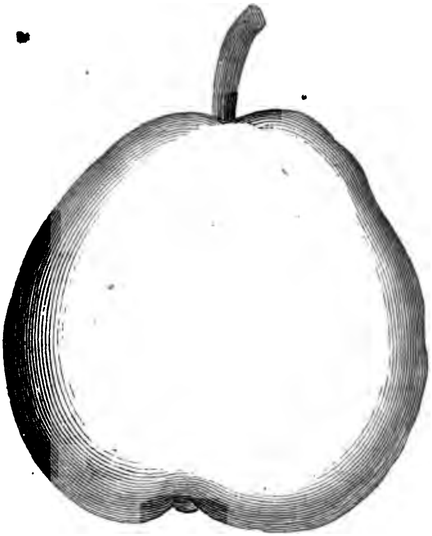
BEURRÉ GRIS D'HIVER NOUVEAU.

Beurré gris de Luçon,
" " d'Hiver,
Beurré gris Supérieur,
Beurré de Fontenay.

DECEMBER TO FEBRUARY.

This pear will be highly appreciated when better known, being one of the most sugary, juicy, melting, and buttery of winter pears; — much resembles the Winter Nelis in texture and flavor, but is more sparkling and juicy. Fruit from medium size to large, obovate, slightly depressed on one side, and hollow on the other. Stem stout and thick, skin, rough golden russet, often with a handsome blush, dotted with russet spots. This pear is the largest and handsomest of the russets. Tree moderately vigorous, very productive, with dark brown, almost reddish wood; promises well on the Quince. Its late keeping — December to February — its ripening without the constant variability of the Easter Beurré, and other winter varieties, will give it a high reputation.

Fig. 86.



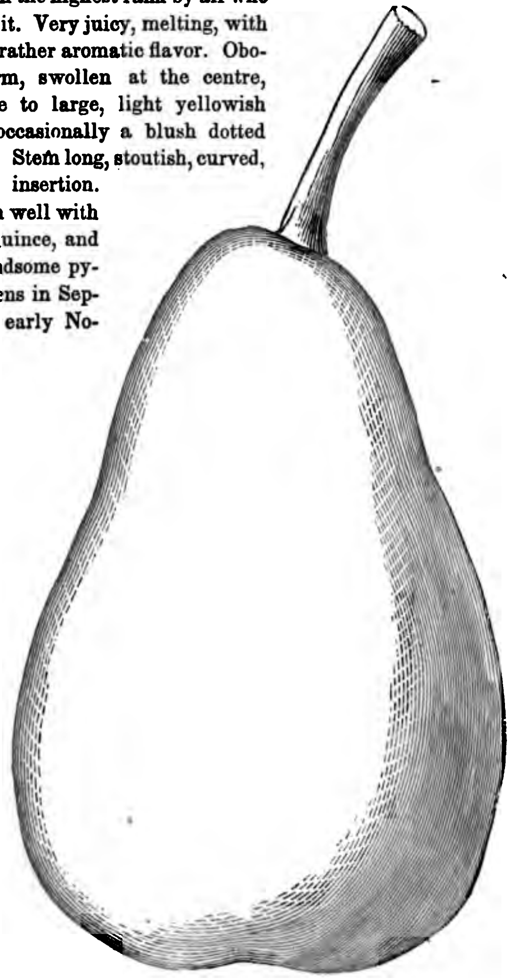
BEURRÉ ST. NICHOLAS.

Duchesse d'Orleans.	St. Nicholas.

DECEMBER TO JANUARY.

Is placed in the highest rank by all who have fruited it. Very juicy, melting, with a high, and rather aromatic flavor. Obovate pyriform, swollen at the centre, medium size to large, light yellowish green, and occasionally a blush dotted with brown. Stem long, stoutish, curved, with fleshy insertion. It has grown well with me on the Quince, and makes a handsome pyramid. Ripens in September and early November.

Fig. 87.



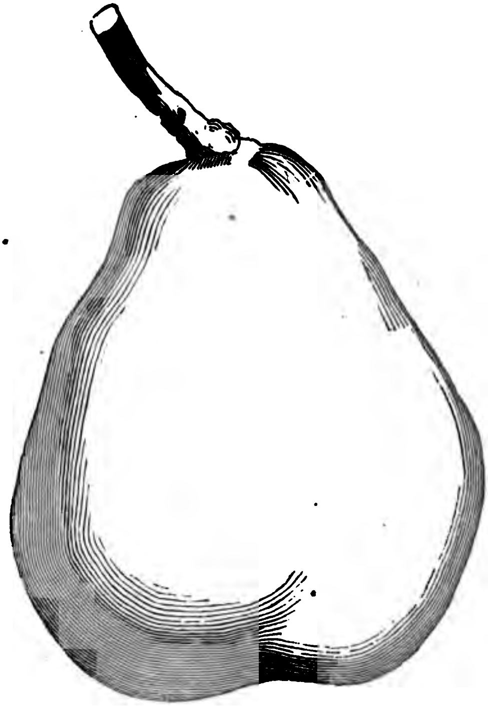
BEURRÉ D'AREMBERG.

Duc d'Aremberg.	Orpheline d'Engheen.
L'Orpheline.	Beurré d'Orphelines.
Deschamps.	Colmar Deschamps.

FEBRUARY.

I intended to place the Beurré d'Aremberg upon the list of rejected varieties, but in deference to the American Pomological Society, I give it here a description. This name has been often erroneously applied to the Glout Morceau. The high claims made by the friends of this variety have not proved well founded: it

Fig. 88.



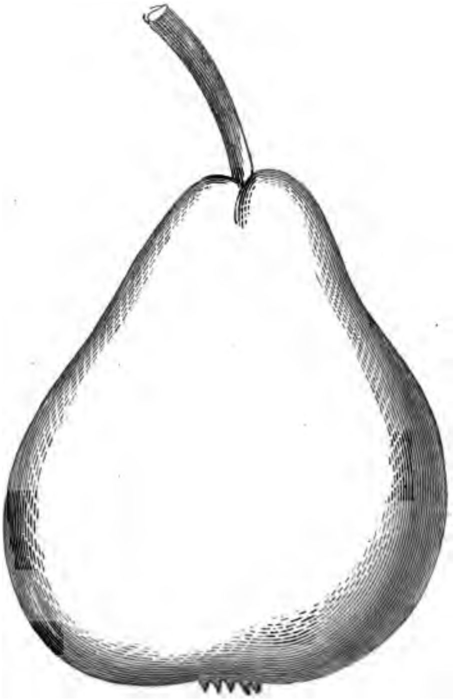
being short-lived, cankerous, and unwholesome on the Quince, very difficult to ripen, often woody and astringent; fruits early, of fair size and color, keeps like a black walnut, and tastes like one eaten —husk and all. Stem thick, irregular, fleshy, declined. Fruit obovate, short pyriform; said by some to be "good," even "best." But it cannot be recomended for general culture.

BEURRÉ D'AMAULIS.

OCTOBER.

Large, productive, fine flavored, often as good as the Bartlett. Tree a prodigious rampant grower, difficult of restraint. The fruit has the defect of never attaining more than a dun, dusky yellowish green, sometimes with a faint blush, and is far from attractive in appearance. Flesh yellowish, often somewhat coarse, must be eaten immediately on ripening, soon becoming mealy and insipid. Shape, short obovate, inclined to irregular turbinate. Stem long, oblique, calyx open, basin shallow

Fig. 89.

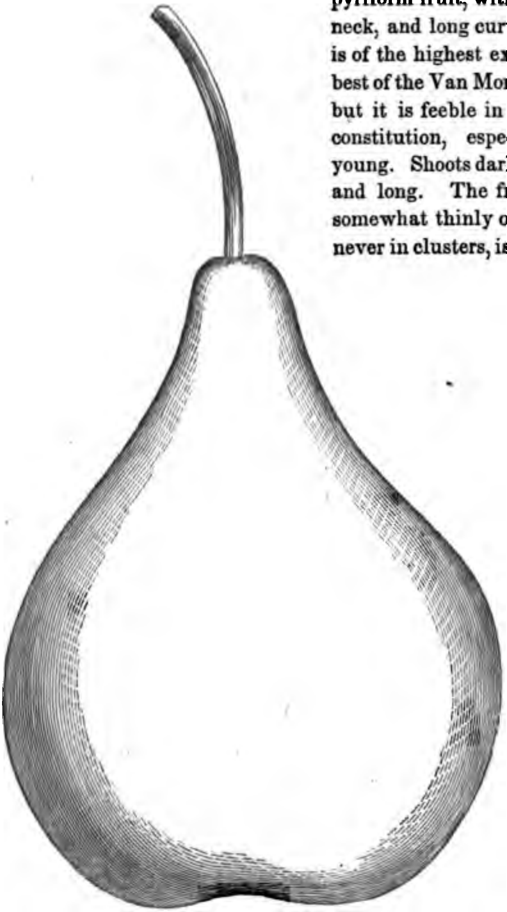


BEURRÉ BOSC.

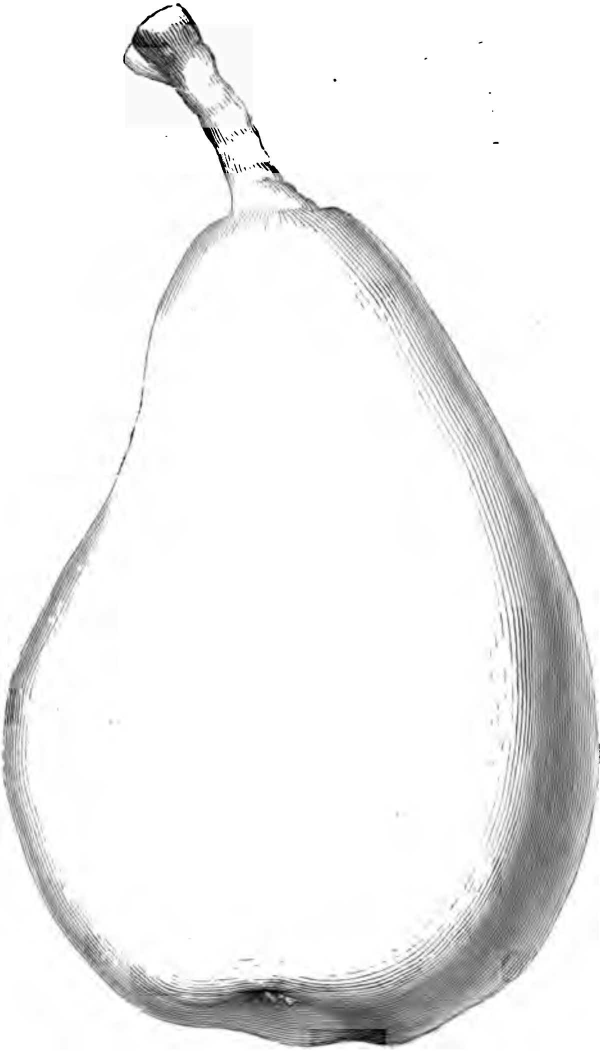
Bosc's Haschenbirne.

NOVEMBER.

Fig. 90.



A most beautiful, tapering pyriform fruit, with a thin, long neck, and long curved stem. It is of the highest excellence, the best of the Van Mons Seedlings; but it is feeble in growth and constitution, especially when young. Shoots dark brown, thin and long. The fruit is borne somewhat thinly over the tree, never in clusters, is a rich russet brown, buttery, melting, of most delicious flavor, white flesh, peculiar shape, which once seen, cannot be mistaken.

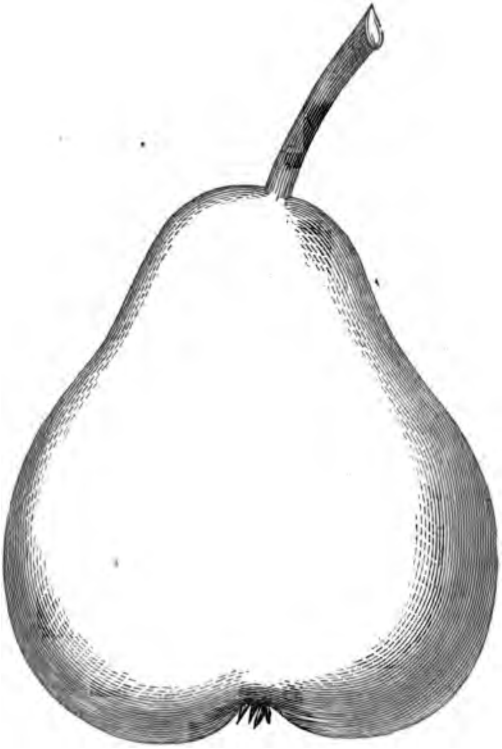


BEURRÉ CLAIRGEAU.

BEURRÉ LANGELIER.

DECEMBER AND JANUARY.

Fig. 91.



A new variety, which I have not thoroughly tested; but so esteemed by the older pomologists, that it must receive a place in this list. Fruit medium size, somewhat irregular obovate pyriform, tending to turbinate, contracting near the neck like Nouveau

Poiteau. Stem stout, rather long, set without depression on the obtuse end of the pear. Basin often furrowed; calyx set deep in it. Color lively green, changing to pale yellow in ripening, with reddish blush, and russet dots. Flesh yellowish white, and when well ripened, melting with abundant, rich, sprightly, subacid juice. Good on Pear, somewhat better on Quince. Tree vigorous and productive. Season during December and January.

BEURRÉ CAPIAUMONT.

Capiaumont. | Aurora Beurré.

This pear deserves a place in this list, not so much from the quality of its fruit as from the great hardiness, productiveness, and beauty of the tree. It is a vigorous grower. Fruit medium size, very regular, long turbinate, tapering insensibly into the stem, which is long, thin, and curved. Quite sweet, melting, buttery, fine-grained and high flavored, but often astringent, its quality being quite variable. Skin smooth, clear yellow, with russet red cheek.

BEURRÉ CLAIRGEAU.

NOVEMBER TO JANUARY.

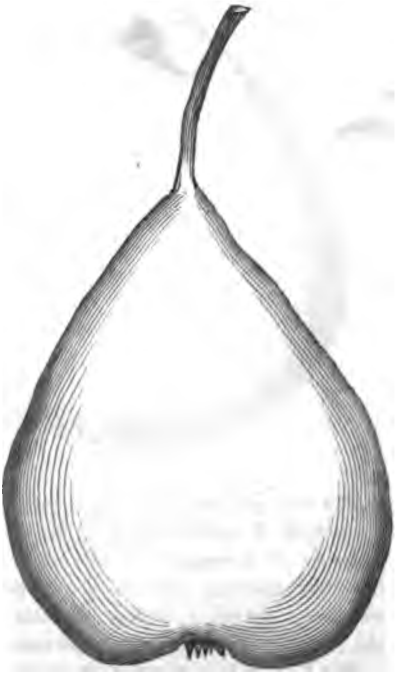
This most noble and beautiful pear disappointed the too sanguine expectations that attended its first introduction; but the reaction will turn in its favor, and it will be fairly appreciated. The fruit is rather coarse in texture, and not always of high flavor; flesh yellowish, and, when quite in perfection, buttery, juicy, with a pleasant, perfumed flavor, and rather granular texture. It is large, pyriform, obtuse, one-sided, keeps well; is good on Quince, and will certainly prove a valuable market fruit. Tree bears as early, as the Bartlett; wood much resembling it.

It is certainly one of the most gorgeous of fruits, coloring with a peculiar gold bronze tint, shading into a brilliant red blush, and when borne, as often occurs, upon trees only two or three years from the bud, and acquiring a size even larger than in the cut, presents a strikingly beautiful appearance. The Clairgeau ripens with a peculiarity which is worthy of notice. While most fine pears lose greatly in quality by over-ripening, becoming rotten at the core, insipid, or mealy, the flavor of this pear is much improved when apparently verging on decay. Indeed, when a considerable portion of the exterior has decayed, the interior will be sound, and retain its flavor, a quality that will not be despised by those who have ripened the core-rotting pears.

Beurré Gifford.

MIDDLE OF AUGUST.

Fig. 92.

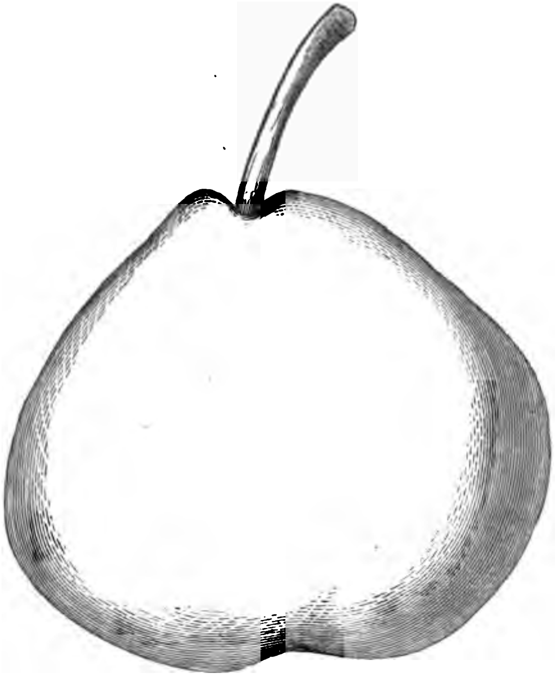


In quality and size, this beautiful pear ranks highest among the August varieties. It approaches nearest the standard of buttery, melting, juicy, and high flavored pears. But on the other hand, the tree is of feeble and straggling growth; growing not more than half as rapidly as most others. It is of a peculiar reddish tinge, branching at obtuse angles. Fruit a little larger than medium, pyriform or long turbinate; stem and fruit merging insensibly. Skin yellow, when ripe, with a red flush, often appearing mottled.

CHURCH.

SEPTEMBER.

Fig. 93.



The original tree still stands in New Rochelle, Westchester County, N. Y., and is traced by Mr. BERKMANS to the Huguenot settlers. It is remarkable, that wherever the Huguenots settled, the Pear abounds, and native varieties of great excellence are common. Around New Rochelle also originated the Parsonage, the Huntington, and others of less note.

The Church Pear is irregular angular, oblate turbinate; stem, long, stout; skin, yellow when ripe; flesh, very buttery, melting and juicy, with perfumed rich flavor when in perfection. It has been claimed as the Platt, which it much resembles, but the identity has not yet been established.

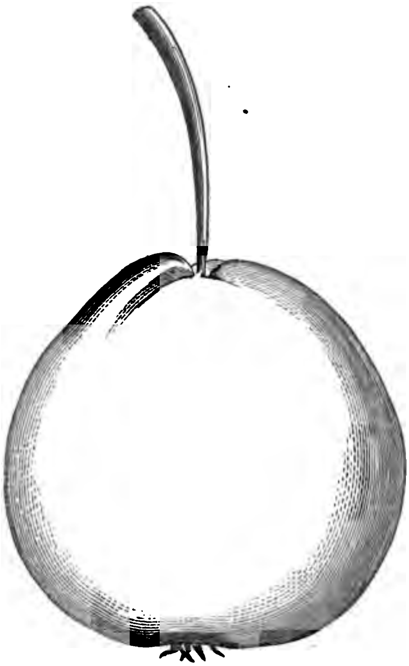
Tree vigorous, healthy, a great bearer.

DEARBORN'S SEEDLING.

AUGUST.

A very nice, juicy little Pear, grown for more than forty years around Boston, where it originated.

Fig. 94.



Tree, a most prolific bearer particularly repugnant to the Quince.

Fruit, when perfect, very juicy, almost melting, and of a refreshing, sprightly flavor, but it is quite often insipid and flavorless, and always so small as to be unfit for market cultivation. Skin very smooth and clear, slightly dotted; ripening with a uniform light yellowish glow. Shape nearly round, stem long. Ripens in middle August, but is not in eating condition quite as soon as the Bloodgood.

BEURRÉ BROWN.

Gray Beurré,
Golden Beurré,
Beurré du Roi,
Isambert,
Brown Butter,
Beurré d'Amboise,
Beurré d'or,
Red Beurré,
Beurré Rouge,
Beurré Dorée,
B. de Treveuren,
Beurré Butter.

SEPTEMBER.

These are but few of the synonyms of this once popular Pear. When in perfection it takes the first rank for melting, buttery texture, abundance of juice and delicious sub-acid flavor, but it is the very chameleon of Pears, and is so uncertain that but few can reasonably hope to ever bring it to its highest excellence.

Fruit, rather large, oblong obovate, stem and flesh meeting without shoulder or basin; skin, a little rough and rusty, and color "such as the gods please." Unfit for general cultivation.

DELICES DE HARDENPONT, OF BELGIUM.

NOVEMBER AND DECEMBER.

The Tree is described by BERKMANS as feeble and unhealthy in Belgium; but growing much better in this country, where it is still not very vigorous. Shoots long and upright.

Fruit regularly pyramidal, tending to turbinate, sometimes angular; stem short, thick; skin rather rough; yellowish green when ripe. Flesh buttery, melting, very juicy, sweet and highly perfumed.

BEURRÉ HARDY.

Beurré Sterkman.

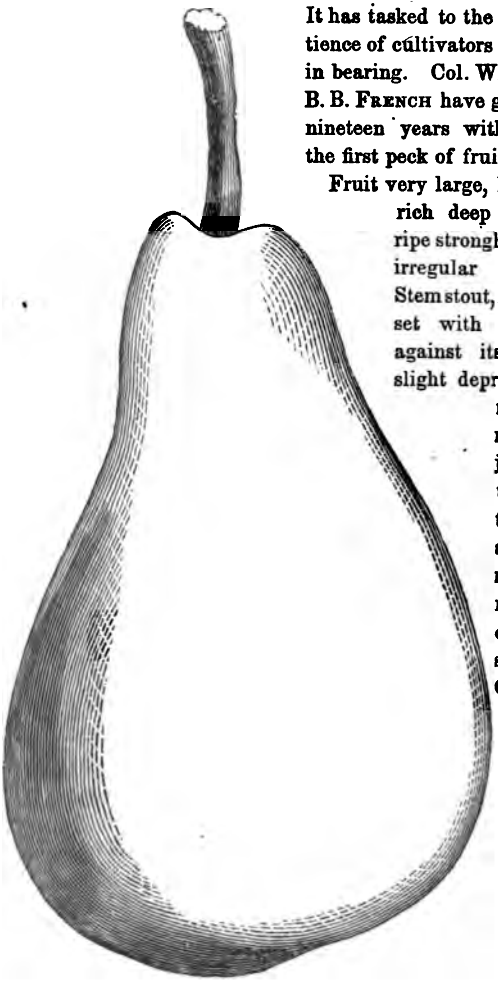
SEPTEMBER AND OCTOBER.

Fruit large, obovate pyriform, one-sided like the Beurré d'Anjou, light reddish green, with brownish spots; stem stoutish, of medium length, inclined, set in a moderate cavity with a high shoulder on the larger side; calyx much spread; basin broad and shallow; buttery, melting with great quantity of rich, sparkling, vinous, perfumed juice. The tree grows vigorously on both pear and quince.

DIX.

OCTOBER TO DECEMBER.

Fig. 95.



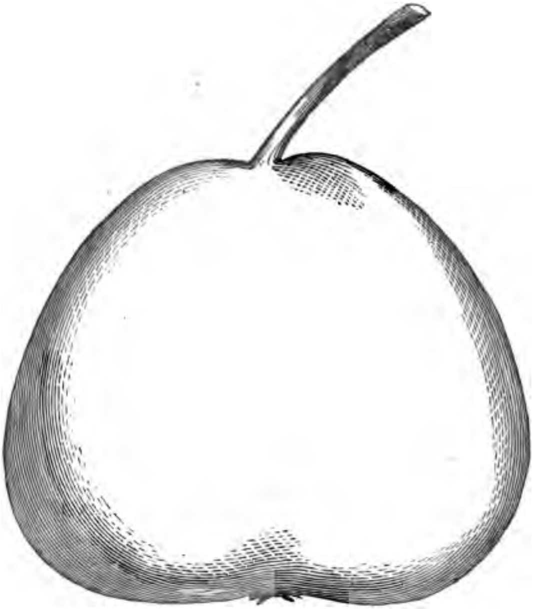
The Dix is a native of Boston. It has tasked to the utmost the patience of cultivators by its tardiness in bearing. Col. **Wilder** and Mr. B. B. **French** have grown the trees nineteen years without obtaining the first peck of fruit.

Fruit very large, long pyriform, rich deep yellow when ripe strongly marked with irregular russet spots. Stem stout, not quite short, set with a lip turned against its base, in a slight depression. Flesh melting, sugary and very juicy, and although not entirely free from a little coarseness, is most rich and delicious. Does not succeed on the Quince.

DOYENNÉ SIEULLE.

Sieulle, | Beurré Sieulle, | Bergamotte Sieulle.

Fig. 96.



This is a most excellent fruit, rather large, very juicy and buttery, somewhat coarse-grained, about half melting. Shape peculiar roundish obovate, and rather angular. Skin, bright, dark green, changing to a greenish yellow, much dotted with green spots.

The hardiness and vigor of the tree and remarkable productiveness entitle it to high estimation as a market pear, although the fruit is hardly high-colored enough for the whimsical taste of a capricious public.

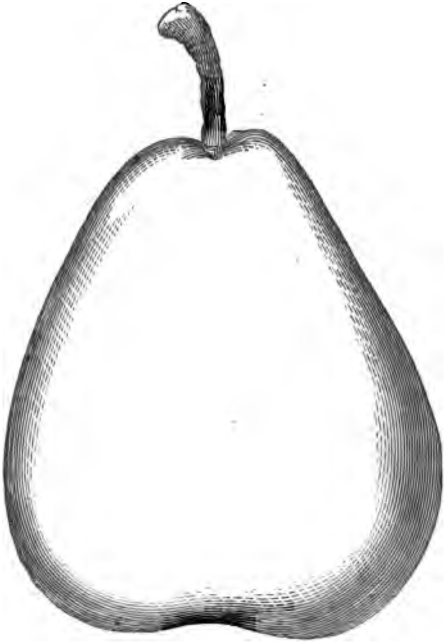
Its growth indicates fitness for the Quince. Season, October and November.

DOYENNÉ D'ALENCON.

Doyenné Gris d'Hiver Nouveau,	St. Michael d'Hiver,
Doyenné Gris d'Hiver d'Alençon,	New Gray Winter Vergalieu.

DECEMBER TO APRIL.

Fig. 97.



Although not yet sufficiently tested, this pear has received the highest praise, wherever well cultivated. I have proved specimens from several localities, and all were excellent. The tree is vigorous, of handsome shape, easily trained to a pyramid, does exceedingly well, and is best on the Quince. Fruit, obovate, obtuse pyriform, with rough, thick, astringent skin of russet green, with coarse russet spots. Flesh, rather coarse-grained, yet melting juicy, and almost buttery, with a sprightly vinous and rich flavor.

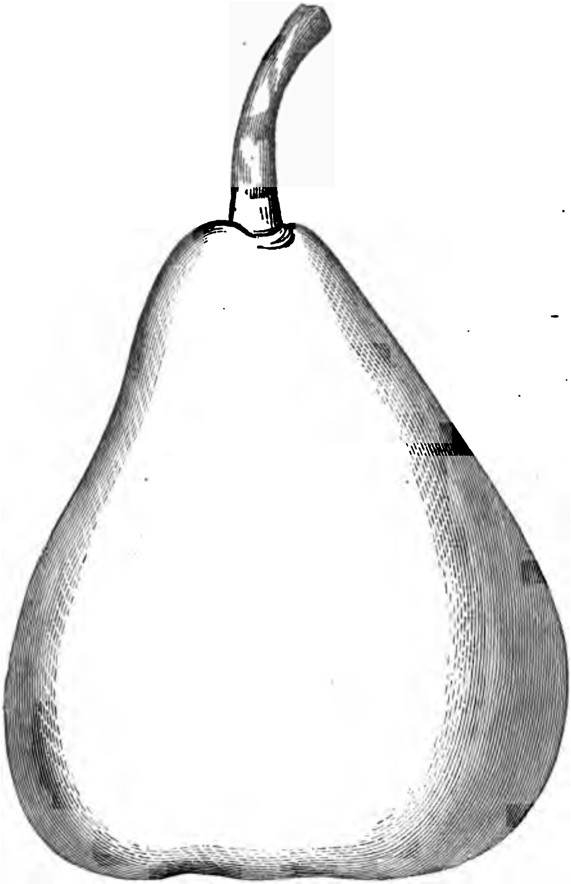
With proper treatment it keeps till April, which makes it valuable for a market Pear. If kept warm it ripens in December.

FREDERIC OF WIRTEMBERG.

Roi de Wirtemberg.
King of Wirtemberg.
Vemuleu d'Eté.

SEPTEMBER.

Fig. 98.



I cannot bring myself to slight this gorgeous fruit, or rate it as low as some pomologists. It is certainly the most beautiful object that has been colored by the pencil of nature. It hangs upon the tree like a drop of gold and crimson, its tints deepening day after day. The flesh is white, melting, and delicious; and when in perfection, sweet and buttery—leaving little to be desired by the taste of the eater. Its growth is singular; the leading shoot is tall, stout, stocky, with few or no radial branches. Does not easily take the pyramidal form.

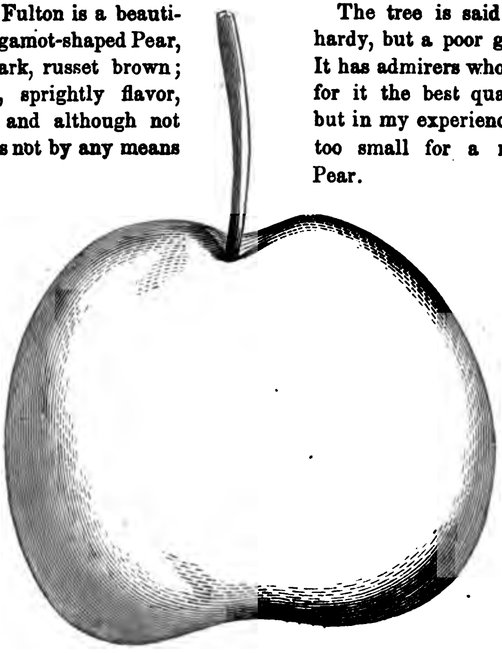
FULTON.

OCTOBER AND NOVEMBER.

The Fulton is a beautiful Bergamot-shaped Pear, of a dark, russet brown; — rich, sprightly flavor, often; and although not juicy, is not by any means dry.

The tree is said to be hardy, but a poor grower. It has admirers who claim for it the best qualities; but in my experience it is too small for a market Pear.

Fig. 99.



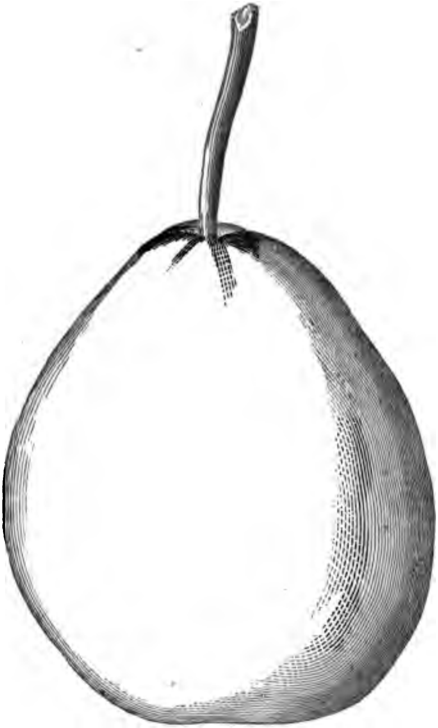
GOLDEN BEURRÉ OF BILBOA.

SEPTEMBER.

One of the most clear, golden-skinned, and beautiful of fruits. It is usually capped with a rich russet around the stem, which is quite long and slender, set in a very slight basin. It is quite small, and not unfrequently much resembles the DEARBORN's Seedling. It is often far from buttery, occasionally a little acid, with an abundance of sprightly juice. When perfect, it is buttery, melting, of a rich, pleasant sub-acid flavor.

Good on Pear or Quince.

Fig. 100.

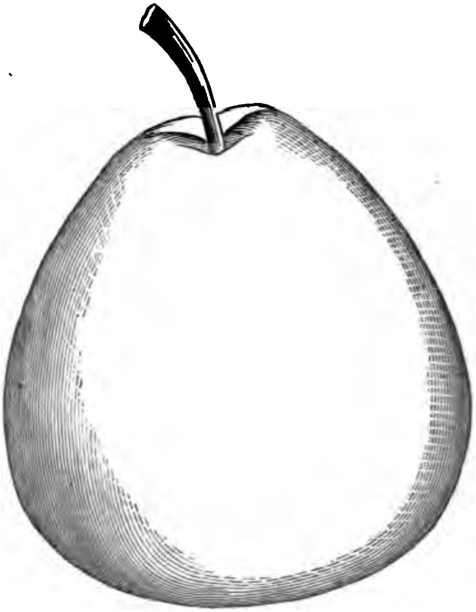


GRAY DOYENNÉ.

Doyenné Gris,	Gray Doyenné,	Gray St. Michael,
" Roux,	Red "	Doyenné d'Automne,
" Galouge,	Gay "	St. Michael Doré.

OCTOBER TO DECEMBER.

Fig. 101.



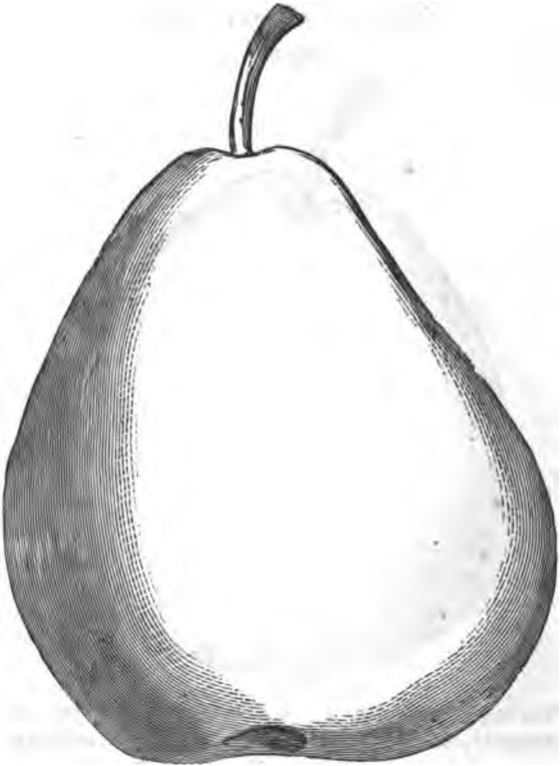
When in perfection, this fruit cannot be too highly praised, but unfortunately, like the White Doyenné, is subject to cracking and spotting, until it loses the very semblance of a Pear. It much resembles the White Doyenné. It is a little rounder than the Vergalieu, with flesh of the same delicious, melting, buttery, fine-grained texture, and like the latter, is in every respect the very type of excellence.

It will not come to perfection on the Atlantic Coast.

Howel.

OCTOBER.

Fig. 102.



I know of no reason why this should not be ranked first-rate, except that it has not been extensively proved. It was raised from the seed by a gentleman in New Haven, whose name it bears. It is classed by the American Pomological Society for general cultivation.

The fruit is large, obtuse pyriform, obovate; stem rather more than an inch long, curved, and set within a cavity; skin a clear, rather pale yellow when ripe, with small russet dots, and occasionally a faint blush. Flesh very melting, with a rich, sparkling, slightly acid juice, faintly perfumed. The tree is vigorous, but not very productive when young, has not been much proved on the Quince.

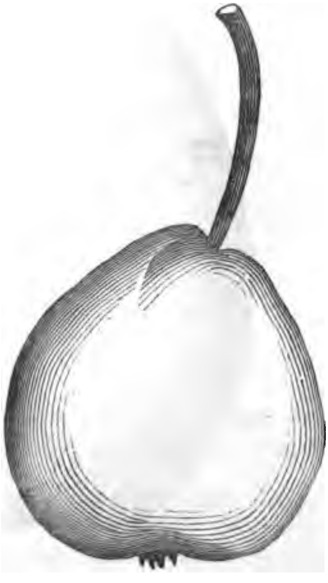
MADELEINE.

Citron des Carmes, | Magdalen.

JULY.

A favorite from its early ripening. It is very delicious when in perfection, melting and juicy, of small size, somewhat obovate, tending to pyriform; stem long and curved, skin smooth, light, yellow green.

Fig. 108.



The fruit is very often far from first-rate; the tree is very liable to blight.

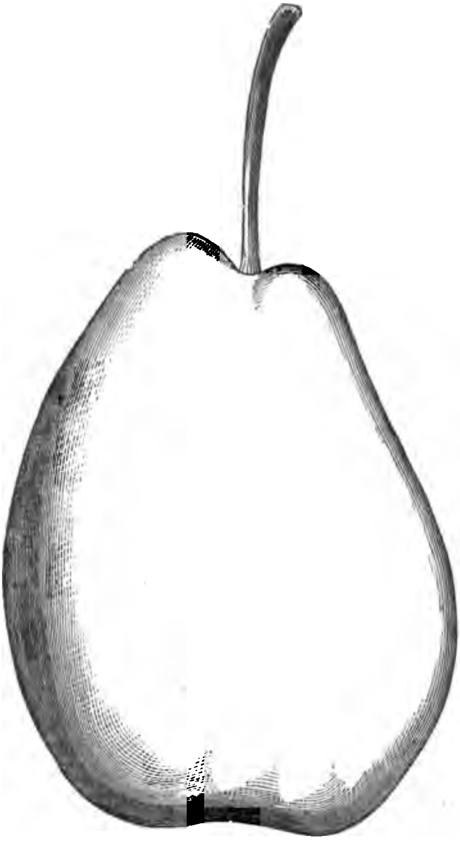
It is surprisingly vigorous in its growth, in favorable locations, and is so regular in the formation of its branches as to readily form a handsome pyramid.

We shall look in vain, however, for high flavor, or great excellence, in pears ripening so early, but as the taste has not become critical by comparison with autumn pears, we are more easily satisfied.

MARIE LOUISE.

Farim Maria Louise, | Marie Chrétienne.

Fig. 104.



This is a most excellent and beautiful pear, but the tree is a feeble straggling grower, forming numerous shoots; easily shaped to a pyramid, but continually escaping from it with its sweeping, curling growth. Fruit large and beautiful, oblong, curved pyriform; stem long, curving to the smaller side, set in a slight depression with a shoulder on the larger side; a rich, clear yellow when ripe; cheek marked with russet spots; flesh a little irregular in quality, but usually buttery, melting to a remarkable degree with a delicious sugary, sparkling flavor. Does not succeed on Quince. Season, first to middle of October.

NAPOLEON.

Medaille, Sucrée Douce,	Roi de Rome, Poire Liard.

SEPTEMBER AND OCTOBER.

This beautiful and delicious pear has only in few instances sustained its European reputation in this country. It has not generally succeeeded on the Quince; on the Pear it is a beautiful and vigorous grower. From observation, I conclude that strong, rich clay soils are best suited to it, and that it does only moderately well on light or porous ones. Its foliage is peculiarly beautiful, having large glossy leaves like the lemon tree.

Fruit, medium to large size, with very smooth, clear, green skin, ripening to a pale clouded yellow. Stem, stoutish and rather short, set in a slight depression; calyx in a broad shallow basin. Flesh white, melting, being but little more than so much sprightly vinous juice when perfect. Many cultivators are confident that the older trees will quite uniformly bring the fruit to perfection, with proper care in ripening.

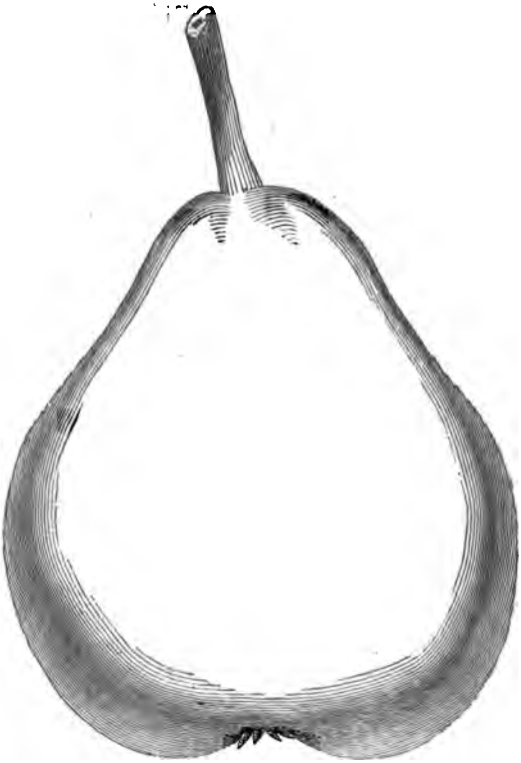
It is certainly, when in perfection, one of the highest flavored pears, containing, as has been said, so great an abundance of delicious juice. Its most serious defects are, the small size it attains in unfavorable soils, and the occasional spotting and cankering characteristic of the White Doyenné.

It has the same thin smooth skin, as the latter pear—a peculiarity of those pears which canker.

NOUVEAU POITEAU.

NOVEMBER.

Fig. 105.



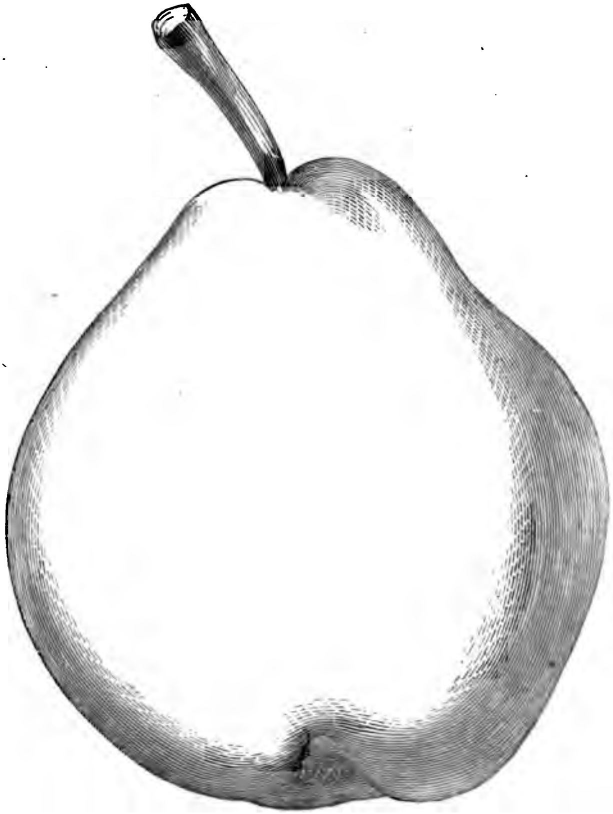
A vigorous, handsome tree, the fruit of which, Colonel WILDER'S description, in 1850, has not too highly colored. In size, the fruit often nearly equals the Bartlett; obtuse pyriform, somewhat sunken near the neck; stem short, stoutish, set without any depression; calyx very open, with the parts turned back. The fruit is not attractive, being of an opaque green, with an occasional blush on the cheek; but its melting, juicy character, and rich, sugary flavor, delights every palate. To insure perfection, it should be grown on the Quince.

ONONDAGA.

Swan's Orange. | **Orange.**

SEPTEMBER TO NOVEMBER.

Fig. 106.

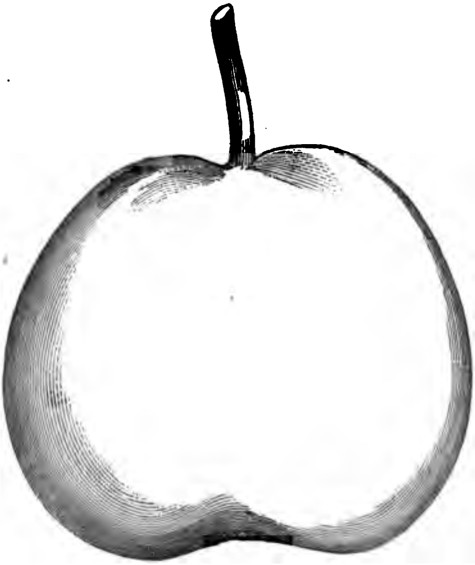


In a rich, strong, clay soil, this is a noble, beautiful, and delicious fruit, but it is liable to great variation. The tree is quite distinguishable by its vigorous and naturally pyramidal form of light grayish shoots. It is very productive, and grows equally well on Pear or Quince. The fruit, when perfect, is melting, buttery, and juicy, but always a little granular, and sometimes acid. It is of a rich, deep yellow, relieved by russet dots; and from its color and obovate shape, was named Orange. It is more often an obtuse pyriform, thickest in the centre, divided into five lobes, between the centre and calyx. It is a splendid market fruit, not always first-rate, and only adapted to certain localities. Its average is equal to that of the Duchesse; but the largest never equals in size the best specimens of the Duchesse.

OSWEGO BEURRÉ.

OCTOBER TO DECEMBER.

Fig. 107.

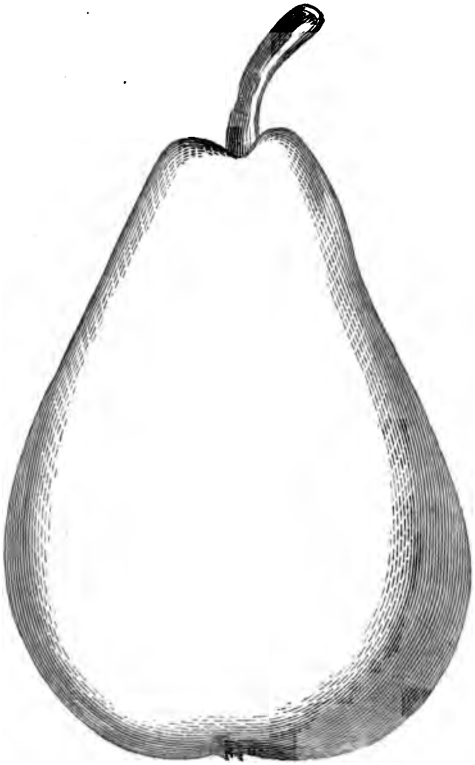


Originated in Oswego, New York, by Mr. W. **Read**. Its great hardiness, long-keeping, and excellence, make it worthy of general cultivation. It is vigorous and productive. Fruit medium size, oblate roundish, a beautiful cinnamon russet, becoming yellowish when ripe. Stem short, set deep in a very regularly rounded basin. Flesh buttery, melting, juicy, high-flavored, and aromatic.

PARSONAGE.

SEPTEMBER.

Fig. 108.



Of the same origin as the Church, and nearly equal excellence. Fruit from the medium size to large, obtuse pyriform, and obovate; skin nearly orange yellow, with a dull red blush, and somewhat russety; stem short, thick, fleshy at its insertion; flesh melting, sugary, with rich sparkling juice; high flavored, but a little coarse and granular.

PARADISE D'AUTOMNE.

Calebasse Bosc.
Princesse Marianne.
Maria Nouvelle.

Generally mistaken at first sight, for the Beurré Bosc, which it closely resembles. But the tree of the Bosc is comparatively feeble, while that of the Paradise is strong and vigorous. Fruit large, pyriform, tapering up upon the stem, which is often nearly two inches long and curved; skin, a rich, yellowish brown russet. Flesh white, buttery, of very rich delicious flavor.

PASSE COLMAR.

Colmar Gris.
Passe Colmar Epinceaux.
Colmar Souveraine.
Colmar Preule.
Ananas d'Hiver.
Colmar Hardenpont.
Souveraine d'Hiver.
Fondante de Mons.
Passe Colmar Gris.
" " Nouveau.
Colmar Dorée.
Fondante de Panisel.

NOVEMBER TO JANUARY.

There are many other besides these more common synonyms. It is such an abundant bearer, that the fruit, especially on young trees, must be thinned to one-third or one-half, to come to perfection. The growth is often so luxuriant as to absorb too much the energies of the tree in one direction, unless pinched back.

This variety affords a fine comparison with the Duchesse, showing the cause of more or less abundant fruiting after abundant blossoming. In the Passe Colmar the pistils and stamens of every flower are strongly and perfectly developed. While in the Duchesse many are imperfect, and but a comparatively small number of pears are produced.

The fruit grows in clusters, fair size, and first-rate quality when thinned; flesh yellowish white, buttery, melting, juicy; rich aromatic flavor. It needs care and shelter in ripening. It is obtuse pyriform; sides suddenly depressed above the centre, giving the appearance of a long pyriform whose base had been pressed up and swollen at the centre. Skin becomes whitish-yellow long before maturity, ripening to a bright yellow, with russet brown spots. Stem long, inserted without depression; calyx open; basin shallow.

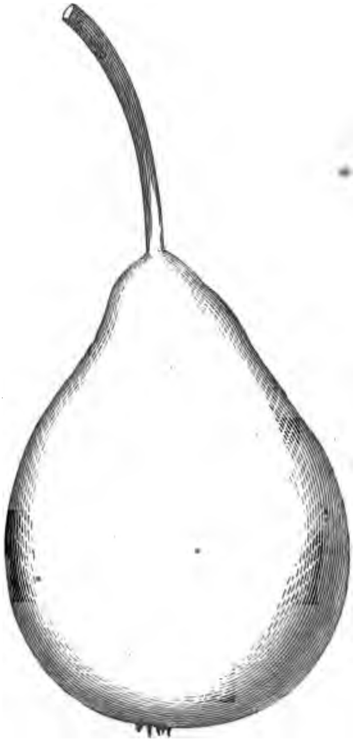
ROSTIEZER.

AUGUST.

A fine little summer pear, from Germany, and though not long in this country, has gained hosts of friends. And although we must not expect large size and high flavor in summer pears, this variety usually approaches nearest to the fine rich flavor of our best autumn pears. It is very juicy and sweet, with a pleasant aromatic taste. Pyriform, with a long slender, curved stem. Skin a yellowish-green, often with a sunny-brown cheek. Tree vigorous, growing well on the Quince.

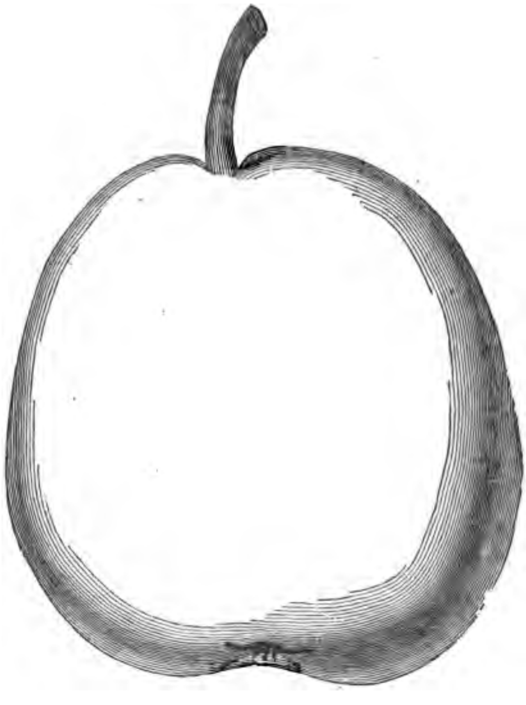
It is like all the summer pears, very greatly improved by gathering before becoming quite ripe; and the terms of quality bestowed upon them will never be found appropriate or truthful, except under this condition.

Fig. 109.



SHELDON.

Fig. 110.

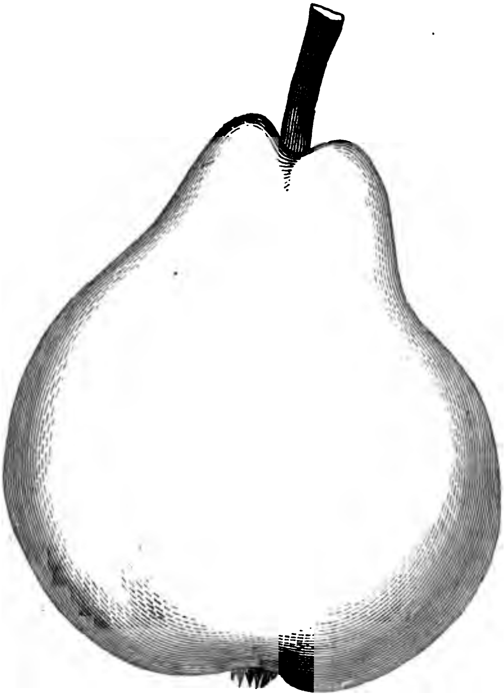


Native. Fruit, medium to large size; beautiful yellowish brown; the cheek a rich, deep, reddish brown; remarkably smooth skin; almost bergamot-shaped, remarkably regular; stem inserted without depression; rich, juicy, melting, high-flavored, when first-rate; quite often insipid, tending to mealiness and rot at the core, when over-ripe. Tree handsome, vigorous, productive, not sufficiently proved on the Quince. During October.

SOLDAT LABOUREUR.

OCTOBER AND NOVEMBER.

Fig. 111.



It is quite surprising that this pear has not made more progress in public esteem. Tree remarkably vigorous, rampant grower, difficult to restrain, but, with care, forming good pyramids. The fruit I consider of the highest excellence. It is medium to large size, nearly obtuse pyriform, with quite sunken sides, which recede suddenly near the centre, giving the lower half a swollen appearance. Skin quite yellow while hard and unripe, ripening to a very bright yellow with small russet dots. Stem long, quite thick, curved, basin small and shallow. It has often, even when quite melting, coarse particles in the flesh; but it is so rich, juicy, and sweet, high-flavored, or occasionally perfumed, that it must rank *best.* The flavor is best on the Quince.

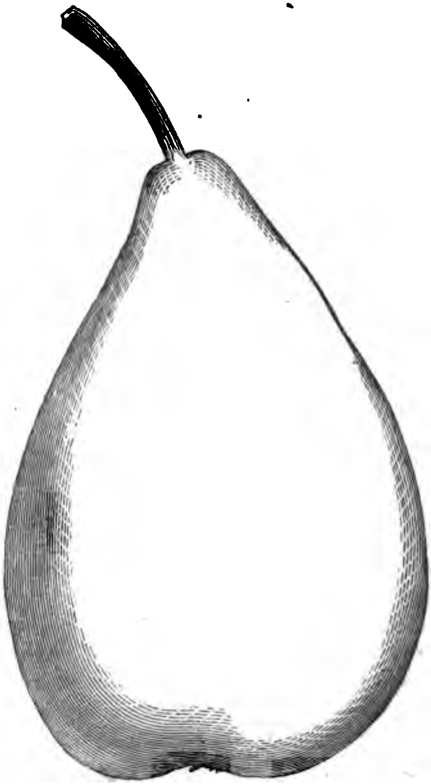
ST. MICHAEL ARCHANGE.

OCTOBER.

The tree of this variety is of unsurpassed elegance. Fruit, long pyriform, large, greenish yellow, dotted with russet. Stem not long, quite fleshy at base, set without cavity. Flesh melting, somewhat granular, full of rich, aromatic juice, and when in perfection, excelled by few. Excellent on quince or pear, and very productive.

This pear has had the fortune of many other fruits, to acquire a reputation for mediocrity, because it was judged from fruit taken from young trees.

Fig. 112.

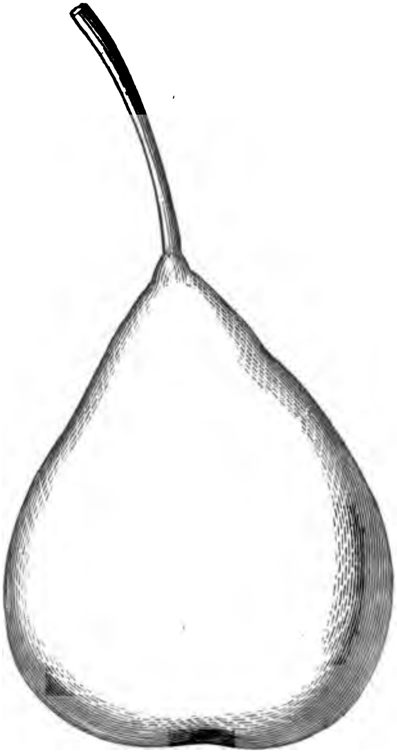


TYSON.

LATE IN AUGUST.

A native of the vicinity of Philadelphia, known before the present century. It has never come into general cultivation, though recommended by the American Pomological Society. A vigorous and upright grower, young shoots reddish brown; a very tardy, but abundant bearer. Fruit, small to medium, pyriform, tapering to the stem, which is long, curved, and set with a fleshy junction, usually swollen on one side; dull yellow, with russet red blush on the cheek, often with dark, almost black, spots. Flesh white, melting, and juicy, with rich, sugary, aromatic flavor. For most localities, perhaps, fully equal to the Bloodgood. Should be grown on the Quince on account of its tardiness.

Fig. 118.



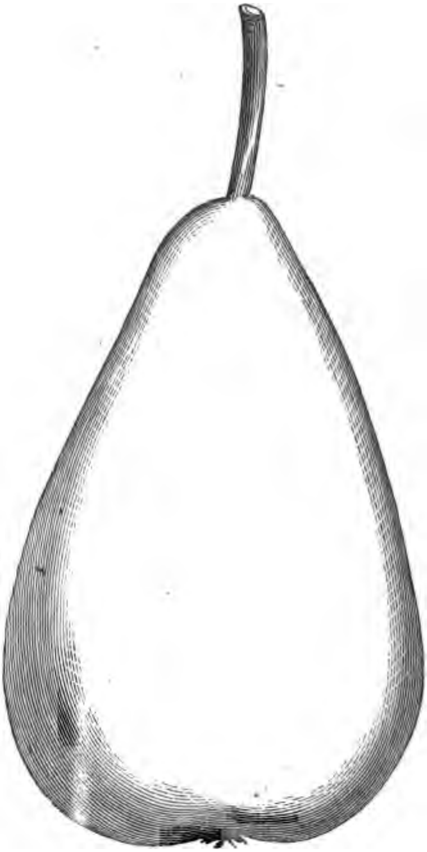
WATERLOO.

Fondante Charmeuse,
Desirée Van Mons,
Excellentissima,
Beurré Charmeuse,
Belle Excellent,
Délices des Charmeuses,
Beurré de Waterlo,
Duc de Brabant.

OCTOBER AND NOVEMBER.

A beautiful, excellent Belgian Pear, more commonly known as Fondante Charmeuse. It is vigorous and productive, and promises well for general cultivation. Fruit large, pyriform, with uneven sides; calyx large; basin rather deep and irregular; stem long and curved, set in flesh rising to meet it; flesh very buttery, melting with abundant rich, vinous juice; skin greenish, with deep crimson blush.

Fig. 114.



PART IX.—GATHERING, MARKETING, AND FRUIT-ROOMS.

SOILS AS AFFECTING QUALITY OF PEARS.

There is nothing more striking in the cultivation of this fruit than the variation of flavor and texture in the same varieties, on different soils. This causes the vexatious contradictions respecting the value of any and every variety. To one, the Louise Bonne de Jersey seems to deserve all the execration, and to another all the adulation, which words can express.

The color of any variety also varies on different soils, so that the fruit almost defies identification. But this change is as often the result of cultivation. The Louise Bonne de Jersey and the Beurré Diel are particularly noted for their superiority on sandy loams, while the Onondaga and Virgalieu are best on strong clay soils.

The adaptation of soils to different varieties can only be ascertained by individual experiment.

THINNING FRUIT.

Good soils, fine cultivation, healthy and vigorous trees, and all the other requisites of pear-growing, will often fail of producing fine fruit, if all that sets is allowed to remain on the tree. The fruit of the Bartlett, Dearborn's Seedling, the Louise Bonne de Jersey, and many other varieties, will set in such quantities, that if thinning is neglected, not one half will reach full size, or acquire their true flavor. Besides, these varieties yield fruit so early, that the trees would be ruined by this precocious fruitfulness. Two years after planting, these varieties will commence bearing, and not more than from two to a dozen specimens should be allowed to ripen annually on each tree, until the fifth year. The period for thinning is, when the pears are from a half to three quarters of an inch in diameter; for, as many fall soon after forming, it is not until then the healthy and perfect ones can be distinguished. Not more than one-half of the thinning should be done at once, and the others may be allowed to remain until we can ascertain the imperfect fruit to be removed.

GATHERING.

There are but few of the finer varieties that are not improved by gathering before they are fully ripe. Not a few have been discarded as unworthy of cultivation, which, by early picking, improve so as to rank among the first in excellence. Several varieties rot at the core when left upon the tree till fully ripe, which will keep for weeks when picked earlier. Among these are, the Flemish Beauty, Beurré Diel, and sometimes the Louise Bonne de Jersey.

The true test of the proper condition for gathering is, the cleaving of the stem from the spur, without breaking, when slightly raised. Some varieties, indeed, should not be left so long even as this; the fruit should not be picked in a wet and cloudy day, or in early morning when the dew is upon it, as its flavor is much affected by the moisture, and its keeping properties much injured. When it is necessary to gather it under such circumstances, it should be exposed to the light and air until completely dry. Pears picked in the middle of a sunny day are much superior in flavor, and keep better; early gathering is only necessary for the summer and autumn varieties. On the other hand, the late-keeping and winter kinds should be picked as late in the season as the frost will allow. Some of them, such as the Easter Beurré, require a long season to mature.

A dry and moderately cool apartment should be appropriated to the storage and ripening of summer fruits, and to no other purpose at the same time.

There is no doubt, that under certain conditions of heat and moisture, absorption as well as evaporation goes on through the skin of the pear. If vegetables are stored in one part of the room, harnesses and lumber in another, and decaying apples and peaches, and perhaps the rubbish and debris of last year's operations remain in a third, feculent exhalations are absorbed by the skin of the fruit in sufficient quantities to change its flavor.

Mr. Wm. Reed, of Elizabeth, whose nursery is almost the perfection of taste and skill, after having expressed strong disapproval of the quality of the Vicar, at the meeting of the Pomological Society, writes, with characteristic frankness, to the President: "I must withdraw my observations against the Vicar, for since our meeting I have ripened mine in a new fruit-room, and found the fruit perfectly melting—more than good—nearly first-rate."

MARKETING PEARS.

A number of pear cultivators have experienced great disappointment in the marketing of fine fruit, from the indifferent prices offered. This has always been entirely due to improper gathering and ripening. Marketmen will not buy fruit already ripe, to be kept for several days for sale to the retailers, who, in turn, must keep it as long for sale to the consumers; nor will the retailers buy pears entirely green, as few of them are sufficiently acquainted with the varieties, to be certain how they will ripen up in color and in flavor.

Some of the fruits should ripen in the hands of the large dealers, that they may be exhibited as samples, being put in their hands when green and hard. The great mistake usually made by pear-growers is, to send the fruit to market after ripening, in such a condition that it will not bear transportation, and often reaches its destination badly jammed, if not a mass of rottenness.

The second error is, for the grower to endeavor to market his own fruit. Few retailers will, in such cases, offer more than one-third or one-half of the price they expect to pay when their trade demands an immediate supply.

Bruising in the gathering is not unfrequently the cause of a low price. Bruised fruit will not bring one quarter of the current rate. The rules which should guide a fruit-grower in marketing his fruit are these:

1. Summer and autumn varieties must be picked, and sent to market when green and hard, must be packed tight in barrels or

cases, with coarse matting around the sides, top, and bottom, so that they cannot shake about.

2. They must be directed plainly to some reputable commission salesman, whose entire business is the sale of fruit, giving him instructions to keep them, until, in his judgment, they would sell to the best advantage. The price thus obtained will usually far exceed that which the grower could procure for himself.

3. The price of pears is governed by their color and size, as well as by their flavor. The Seckel is the only exception to the rule, that none but yellow pears will command the highest price.

COLORING AND RIPENING OF SUMMER AND AUTUMN PEARS.

While many varieties will ripen upon the tree with rich golden or crimson colors, like the Bartlett and Seckel, all varieties of pears will attain a richer tint as well as higher flavor by a little attention. For the attainment of the best result, darkness, warmth, and masses of fruit are necessary. The fruit picked green should be exposed long enough to become perfectly dry, and is then packed in cloth-lined barrels and cases. The following, from a report of a Committee of the Massachusetts Horticultural Society, exhibits the results of attention to minute particulars:

"Mr. JOHN GORDON, of Brighton, Mass., cultivates between three and four acres, the most part of which is trenched and under-drained, and almost entirely covered with pear trees, thickly planted, two-thirds of which are on quince stocks. Mr. G. raises but few varieties, and those such as he finds sell most readily in the market, and make the most profitable return. All his fruit is carefully picked by hand; and some five or six days before designing it for market, it is carefully packed away in boxes twenty inches square, and six or eight in depth, with a woollen cloth lining at the bottom, on which is placed one layer of pears; that is covered with woollen cloth, and another layer of pears; when the box is covered more thickly with woollen cloth, and placed away for what he calls the sweating process, which gives the fruit a rich coloring, and ripens it for market. Mr. GORDON states that cotton does not produce the same effect, nor ripen the fruit so fast. And that the result of this care is best seen in the prices obtained in marketing; for while his Bartletts were yielding him ten dollars a bushel in Boston, other wagons by the side of his contained pears of that variety which were sold for only three dollars a bushel, on account of their unripened condition."

RIPENING OF WINTER PEARS.

Much chagrin has been experienced by those who, for the first time, have attempted to ripen winter pears. Many varieties proclaimed by the books as ripening from December to April, obstinately persist in becoming melting and luscious in November and early December.

The Winter Nelis, the Lawrence, the Beurré d'Hiver, and others, attain this delicious maturity in the early part of December, instead of keeping sound and hard till February. But the most disheartening and vexatious phase of the matter is, the withering, shrivelling, and premature rotting of the pears, to which a still later maturity has been attributed. The Easter Beurré, Glout Morceau, Doyenné d'Alençon, lose a great quantity of their juice by evaporation, and resemble a potato kept one year, quite as much as a pear.

The Pear, unlike the Apple, has little or no oleaginous matter deposited upon the skin, to prevent the rapid evaporation of its juice, and preserve it from shrivelling, so that the porous and unprotected skin of the Pear readily allows its juice to escape. In all efforts to preserve it, therefore, we must keep in view this defect. Some attempts to form an artificial covering by varnishes. &c., have been made, but they have all been conducted without reference to the conditions necessary for *ripening*, being only intended for the *preservation* of the fruit.

The law which governs these conditions may be stated as follows: *As it is only by contact with the atmosphere that pears can be ripened, and as that very atmosphere abstracts the vital fluids of the fruit, it becomes a necessity that the pear should not be in contact with free or moving atmosphere until the period of ripening has arrived.*

The Pear, like the Apple, is composed of the proximate elements, starch, sugar, and albumen, with water and malic acid. The ripening of the fruit is the completion of that chemical process by which starch is changed into sugar, and is always the first step towards decay. Fruit has reached the point of highest excellence when it contains the greatest quantity of sugar, and the sugar in contact with the albumen has not commenced the putrid or acetous fermentation.

By protecting them from free atmosphere in close cases, and by preservation in a cool apartment, we are enabled to delay the ripening and prevent the withering of pears. There is, however, a fixed limit to this preservation. The inherent tendency to decay, which pervades all organized matter, prevents us from more than temporarily postponing it. The Duchesse d'Angoulême, which may, by skillful management, be kept till Christmas, can by no means be preserved as long as the Easter Beurré.

After a pear has become somewhat withered, it can never ripen fairly, as sufficient water is not present to perfect the change. It will be seen at once, that all the elaborate instruction for shelving an apartment, and laboriously placing the fruit in single layers thereon, so as not to touch, are in entire contradiction to the rules above noted. It has confounded many an amateur, to find his plain and unscientific neighbor with an abundance of pears at Christmas, while his own had all long before decayed.

A gentleman who had but half a bushel of Glout Morceau Pears, preserved them till late in January, by the following plan: A barrel was half filled with sound Baldwin apples, in November, the pears placed upon them, and the barrel filled with apples, and put away in a dry cellar; when taken out, the pears were fresh and green as when first picked, needing but an exposure of a week or more in a warm room to become golden in color and deliciously melting and juicy.

All our winter pears need a somewhat longer season than we usually have north of New York City. This renders their quality a little uncertain; but some attention to their growth will usually obviate this uncertainty. The large amount of acid juice which they contain must be overcome by the alcoholic or saccharine change. If the amount of the sugar-producing principle which the trees derive from the soil, or from the atmosphere, is too small, the ripening will, necessarily, be imperfect. The true remedy for this would naturally seem to be, that which practice has proved to be correct. The small-sized and badly-shaped fruit must be thinned out early in the season. The rest should be allowed to remain on the tree as long as safe from freezing, and packed away soon after gathering, in cases with limited ventilation. Judgment must be exercised in determining the amount of fruit to remain on a tree. The quantity of winter pears must be less than is allowable in the case of summer or autumn pears.

Without question, *winter pears, like other fruit, can only ripen perfectly in masses.* There is some undiscovered influence in the contact of fruit with fruit, that gives to masses a perfection of flavor unattainable with small quantities.

FRUIT-ROOMS.

For effecting these conditions of ripening, expensive structures, fruit-houses, and rooms have been erected, and it is but just to say, have, in many cases, resulted only in disappointment. When one has not a good dry cellar, it may become necessary to provide a fruit-room, and the reason why cellars are not generally suitable for preserving fruit is, that they are usually too damp; they should be of low and even temperature, and dark. Fruit-rooms should be built with double walls, confining a stratum of air between, which is sometimes more perfectly accomplished by filling in with dry tan, charcoal dust, and similar substances. There should be but one window, and that fitted with double sashes. Ventilators should be provided, which should be allowed to change the air of the room only sufficiently to prevent its becoming feculent and damp. No decaying fruit should be permitted to remain in the room, nor any vegetables or substances having odor. A gentleman who had expressed much disappointment with the flavor of several fine varieties of pears, was greatly surprised by having the cause of the inferiority of his fruit pointed out. He at once commenced removing from his fruit room all the materials belonging to the harness and lumber-room, the decaying matter accumulated in corners and boxes, and finished with thoroughly cleansing and whitewashing the walls. The pears ripened in the room, thereafter, were not only a source of gratification in their fine flavor, but of surprise at the means of their perfection. Other fruits may be exposed on shelves, but pears should be inclosed in boxes with tight-fitting covers, or if the quantity is large, in well-made barrels, headed up. A fruit-house, thus arranged and managed, would be a profitable adjunct to a fruitery. But for most amateurs, a dark closet in the house, or a room fitted up in the cellar, or even the cellar itself, kept clean and sweet, will suffice. For small quantities of pears, cheese-boxes, with close covers, have been found cheap and convenient. These should be always freed from the odor of cheese, by cleansing in hot water, with soda or potash. It has been recommended and practiced by many to wrap pears in paper, cotton, and similar substances; but I have found all such preparations worse than useless. They not only absorb the moisture of the pears more rapidly than the atmosphere, but they abstract the aroma of the fruit, and leave it comparatively tasteless. These substances being carbonaceous, act as absorbents of the peculiar flavor, like charcoal.

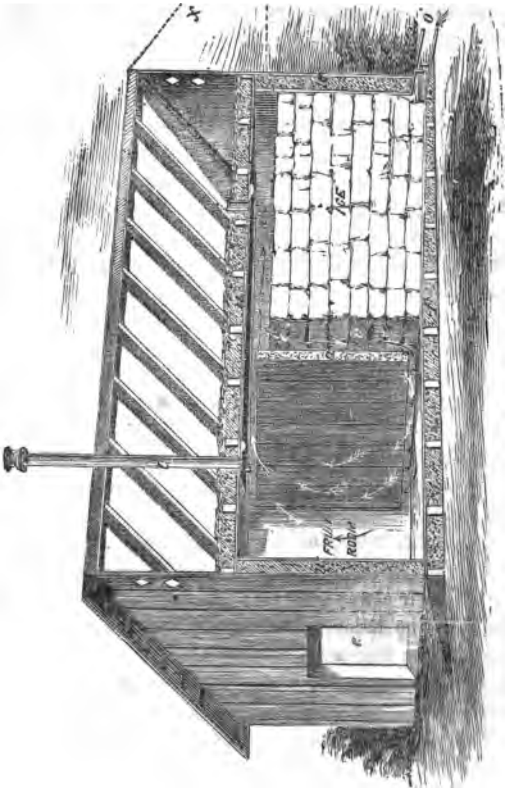
Mr. BARRY informed me, that after many years of experience, he had found the most effective means of preserving winter pears to be: late gathering; packing away carefully none but sound fruit, in close barrels, leaving them in an open shed, only protected from rain and direct rays of the sun, as long as the temperature is above the freezing-point.

The practical difficulties in the use of fruit-rooms seem to have been overcome by Mr. SCHOOLEY. The accompanying plan of his Preservatory has appeared in the *Country Gentleman*, and *American Agriculturist.* From the latter, the description of its construction, and the rationale of its effect is extracted.

Our illustration represents one-half of a building, supposed to be divided through the middle, from the ridge-pole to the ground, in order to better show the interior arrangements. This structure may be a large one, twenty or thirty feet each way, or only a small room of but a few feet in size.

The side-walls, *w*, *w*, and the lower and upper floors, *f* and *u*, are made double, being filled in with saw-dust. The upper floor, however, consists of a single layer of boards, nailed upon the under side of the joists, with the saw-dust piled on loosely, a foot or more in thickness. Above this, is an open space or garret, under the

Fig. 115.



FRUIT PRESERVATORY.

rafters or roof, with holes in each gable-end to admit a free circulation of air. The main room is divided into two compartments—the fruit-room and ice-room—by the partition *d*. The partition *d* unites with the walls on both front and rear, but a small opening of a few inches is left both above and below it—that is, between the whole length of the lower and upper edges and the floor and the ceiling. The ice, as represented, is piled up in a compact mass in the right division, and covered in the usual manner with straw. A small vacant space, *v*, is left between the ice and the division-wall, though this is not necessary, unless the entire body of ice is so compact and frozen together as to prevent the air from circulating through it. The floor, under the ice, descends to the right from *f*, so as to carry any waste water out at *o*. There is an ingenious arrangement in the waste-pipe to prevent the access of air or vermin. It will readily be seen, that before the water rises high enough to overflow the right projection, or gate, the upper or left-hand gate dips down into it, so that the opening is always closed with water.

The air around and among the ice will always be kept cool. It will, consequently, settle downward, and flow along *under* the division-wall, *d*, and into the lower part of the fruit-room. At the same time, the warmer air will flow into the ice-room through the opening *over* the division-wall. The arrows show the direction of the currents of air. This motion will always be kept up so long as the air in the fruit-room is in the slightest degree warmer than that in the ice-room. We see, then, that by such an arrangement the fruit-room is practically kept nearly as cool as if actually filled with ice.

There is another important end secured by this arrangement, viz., that the air in the fruit-room is kept very *dry*, or free from moisture. The air always contains more or less of *invisible* water floating in it. The amount of water in the air depends upon its temperature. The warmer air of the fruit-room takes up moisture from the articles there; but when it passes over to the ice, being there cooled, it gives up a portion of this moisture to the ice, flows back below in a drier condition, to take up more moisture as it is warmed again. This change goes on unceasingly.

At *e* is seen the entrance to the store-room, in which may be kept all kinds of food, vegetables, fruit, &c. Should the air need changing at any time, to get rid of odors, it is done thus: Just under the ceiling is seen a flat slide. Moving this to the left, two holes through it will be brought under the two ventilators, one leading into the open air above, the other into the garret. When this is done, the fresh air from the garret will settle into the ice-room, while the warm air in the fruit-room will ascend through the larger ventilator, and pass off.

CATALOGUE OF NATIVE VARIETIES OF PEARS,

OF GREAT EXCELLENCE, AND GENERAL REPUTATION.

[ABBREVIATIONS.—*s.* small, *m.* medium, *l.* large, *b.* best, *g.* good, *v. g.* very good, *f.* fair, *p.* poor.]

VARIETY.	LOCALITY OF ORIGIN.	SIZE.	QUALITY	RIPENS.	COLOR WHEN RIPE.	SHAPE.
ANDREWS	Boston	*l.*	*b.*	Sept.	Yellow—red cheek	Long pyriform.
BUFFAM	Rhode Island	*s.*	*b.*	Sept.—Oct.	Reddish brown	Oval.
BLOODGOOD	Flushing	*s.*	*b.*	Aug.	Yellow	Roundish Turbinate.
BERGEN	Brooklyn, L. I.	*l.*	*v. g.*	Oct.	Yellow—red cheek	Turbinate.
COLUMBIA	Westchester	*l.*	*v. g.*	Dec.—Jan.	Yellowish green	Obovate pyriform.
CUSHING	Hingham	*m.* to *l.*	*v. g.*	Sept.	Greenish yellow	Obovate.
CHURCH	New Rochelle	*s.*	*b.*	Sept.	Yellow	Oblate turbinate.
CHANCELLOR	Germantown	*l.*	*g.*	Nov	Russety yellow	Obovate.
DIX	Boston	*l.*	*b.*	Oct.—Nov.	Yellow	Pyriform.
DEARBORN'S SEEDLING	Boston	*s.*	*b.*	Aug.	Clear yellow	Round Turbinate.
DALLAS	New Haven	*m.*	*v. g.*	Nov.	Yellow—red russet cheek	Slightly pyriform.
FULTON	Topsham	*s.*	*v. g.*	Oct.—Nov.	Light russet	Round bergamot.
HOWEL	New Haven	*l.*	*b.*	Sept.—Oct.	Smooth yellow	Round pyriform.
HOSENSCHENCK	Pennsylvania	*m.*	*v. g.*	First Sept.	Clear yellow	Roundish.
KIRTLAND'S SECKEL	Ohio	*s.*	*v. g.*	Sept.	Russet yellow—red cheek	Obovate bergamot.
KINGSESSING	Philadelphia	*l.*	*v. g.*	Sept.	Greenish yellow	Truncate pyriform.
LAWRENCE	Flushing	*m.* to *l.*	*b.*	Dec.	Clear yellow	Obovate pyriform.
LEWIS	Roxbury	*m.*	*v. g.*	Oct.—Feb.	Green	Obovate.
LODGE	Philadelphia	*s.* to *m.*	*v. g.*	Sept.—Oct.	Greenish brown	Pyriform—one sided.
ONONDAGA	Onondaga	*l.*	*v. g.*	Oct.	Yellow	Round pyriform.
OSWEGO BEURRE	Oswego	*m.*	*v. g.*	Nov.	Russet yellow	Round oblate.
PETRE	Philadelphia	*l.*	*v. g.*	Oct.—Nov.	Russety yellow	Obovate.
PARSONAGE	New Rochelle	*l.*	*v. g.*	Sept.	Yellow russeted	Obtuse pyriform.
PRINCE'S ST. GERMAIN	Flushing	*m.*	*v. g.*	Dec.—Mar.	Brownish green	Obovate oval.
SECKEL	Germantown	*s.*	*b.*	Sept.—Oct.	Red	Obovate.
STEVEN'S GENESSEE	Lima, N. Y.	*l.*	*v. g.*	Sept.	Golden Yellow	Roundish.
SHELDON	Wayne County	*m.* to *l.*	*b.*	Oct.	Brown	Roundish oval.
TYSON	Philadelphia	*s.*	*v. g.*	Sept.	Clear yellow	Conic pyriform.
WASHINGTON	Delaware	*m.*	*b.*	Sept.	Yellow—red dots	Oval obovate.

CATALOGUE OF NATIVE VARIETIES OF PEARS,

OF GOOD QUALITY — VARIETIES OF SOME REPUTATION — NEW VARIETIES AND REJECTED VARIETIES.

[Abbreviations.—*s.* small, *m.* medium, *l.* large, *b.* best, *g.* good, *v. g.* very good, *f.* fair, *p.* poor.]

VARIETY.	LOCALITY OF ORIGIN.	SIZE.	QUALITY	RIPENS.	COLOR WHEN RIPE.	SHAPE.
Abbott	Providence	*m.*	*g.*	Sept.	Yellow and Red	Obovate pyriform.
Adams	Waltham	*l.*	*v. g.*	Oct.	Yellow—red cheek	Pyriform.
Alexander	Alexandria, N. Y.	*m.*	*g.*	Sept.	Yellowish green	Obovate—one sided.
Bleeker's Meadow	Pennsylvania	*s.*	*f.*	Oct.—Nov.	Yellow—red dots	Round bergamot.
Boston	Boston	*m.*	*v. g.*	Sept.	Yellow—green dots	Obovate.
Brandywine	Pennsylvania	*m.*	*g.*	Sept.	Yellowish green, russet dots	Irregular pyriform.
Beurre Preble	Maine	*l.*	*v. g.*	Oct.—Nov.	Greenish yellow, russet dots	Oblong obovate.
Burtnett	Massachusetts	*l.*	*f.*	Oct.	Yellow	Obtuse pyriform.
Burlinghame	Ohio	*m.*	*p.*	Sept.	Yellow	Oblate.
Bowne's Winter Russet	Flushing	*l.*	*g.*	Jan.	Greenish yellow	
Belle of Flushing	Flushing	*m.* to *l.*	*g.*	Aug.—Sept.		Pyramidal.
Cumberland	Rhode Island	*l.*	*g.*	Sept.—Oct.	Yellow—red cheek	Obovate.
Copia	Philadelphia	*l.*	*f.*	Sept.—Oct.	Yellow	Obovate pyriform.
Comstock		*m.*	*g.*	Nov.	Yellow—red cheek	Obovate.
Cath. Gardette	Philadelphia	*m.* to *l.*	*b.*	First Sept.	Yellow—red dots	Roundish obovate.
Citron	New Haven	*s.*	*f.*	Aug.—Sept.	Greenish red shade	Round.
Clay	New Haven	*m.*	*f.*	Oct.	Yellowish red dots	Obovate pyriform.
Collins	Watertown, Mass.	*m.*	*v. g.*	Oct.	Greenish yellow	Obovate turbinate.
Cooke	Virginia	*l.*	*v. g.*		Yellow	Pyramidal.
Cabot	Salem	*m.*	*v. g.*	Sept.	Russety yellow	Round turbinate.
Canandaigua	Canandaigua, N. Y.	*m.* to *l.*	*v. g.*	Sept.	Yellow	Obtuse pyriform.
Calhoun	New Haven	*m.*	*v. g.*	Sept.—Oct.	Yellow—red cheek	Globular.
Cross	Massachusetts	*m.*	*g.*	Dec.—Jan.	Yellow—red cheek	Roundish.
Capsheaf	Rhode Island	*m.*	*v. g.*	Oct.	Russet yellow	Roundish Obovate.
Christmas	Cincinnati	*m.*	*v. g.*	Dec.—Jan.	Bronze russet	Roundish.
Chelmsford		*l.*	*f.*	Sept.	Yellow—red cheek	Pyriform.
Chapman		*m.*	*f.*	Oct.	Yellow	Ovate pyriform.
Connecticut	Connecticut	*m.*	*p.*		Yellowish green	Oblate.
Coit's Beurre	Ohio	*m.*	*f.*	Sept.	Yellow—russet	Turbinate pyriform.

Dikeman	New Haven	*m.*	*v. g.*	Sept.—Oct.	Yellowish	Roundish.
Dow	New Haven	*m.*	*g.*	Sept.—Oct.	Yellowish green	Acute pyriform.
Dana's No. 16	Roxbury	*m.*	*b.*	Nov	Yellowish russet	Obovate.
Dana's No. 19	Roxbury	*l.*	*v. g.*	Nov	Yellow	Obovate.
Dorr	Rhode Island	*l.*		Aug	Yellow—red cheek	Obtuse pyriform.
Edwards	Hew Haven	*m.*	*p.*	Sept	Yellow—red shade	Round.
Elizabeth—Edward's	New Haven	*m.* to *l.*	*g.*	Oct	Yellowish green	Obtuse pyriform.
Early York	Connecticut	*m.* to *l.*	*g.*	First Aug	Yellowish russet dots	Obtuse pyriform.
Frederick Bremer	Clinton, N. Y.	*m.*	*v. g.*	Oct	Greenish yellow	Irregular pyriform.
Frankford	Frank, Penn.	*m.*	*b.*	Nov	Yellow	Roundish pyriform.
Foster's St. Michael		*m.*	*f.*	Sep—Oct	Dull yellow	Roundish obovate.
Green Mountain Boy	Vermont	*m.*	*v. g.*	Oct	Deep yellow	Angular pyriform.
Gustin's Summer	New Jersey	*s.*	*g.*	First Sept	Yellow	Roundish.
Gen. Taylor		*m.*	*v. g.*	Nov	Cinnamon russet	Turbinate.
Huntington						
Haddington	Philadelphia	*l.*	*v. g.*	Oct—Nov	Yellow—green	Roundish.
Hanover	New Jersey	*s.*	*g.*	Oct	Greenish—red cheek	Roundish obovate.
Heathcot	Waltham, Mass	*m.*	*g.*	Sept	Greenish yellow	Obovate.
Henrietta	New Haven	*m.*	*g.*	Sept	Yellowish red cheek	Obovate pyriform.
Howe's Winter	Virginia	*l.*	*g.*	Nov—Jan	Russet yellow	Roundish.
Huguenot	Salem	*m.*	*p.*	Oct	Yellow—red spots	Roundish.
Hanners		*m.*	*g.*	Sept	Greenish yellow	Obovate.
Hegeman	Roslyn, L. I.	*m.*	*b.*	Sept	Reddish brown	Oval.
Hull	Massachusetts	*m.*	*v. g.*	Oct	Russety yellow	Obtuse pyriform.
Harvard	Cambridge	*l.*	*g.*	Sept	Russet yellowish—red cheek	Oblong pyriform.
Island Pear	Brooklyn, L. I.	*m.*	*g.*	Sept	Yellow—dull	Obtuse pyriform.
Ives' Seedling	New Haven	*m.*	*g.*	First Sept	Greenish yellow—red shade	Globular.
Ives' Pear	New Haven	*s.*	*g.*	First Sept	Greenish red cheek	Turbinate.
Ives' Bergamot	New Haven	*s.*	*f.*	First Sept	Greenish yellow—russet	Bergamot.
Ives' Virgalieu	New Haven	*s.*	*g.*	Oct	Greenish red shade	Pyriform.
Ives' Winter	New Haven	*m.*	*f.*	Dec	Yellowish russet spots	Pyriform.
Jackson	New Hampshire	*m.*	*g.*	Sept.—Oct.	Greenish yellow—russet	Turbinate pyriform.
Jones' Seedling	Philadelphia	*m.*	*f.*	Oct	Yellow—russet cheek	Pyriform.
Johonnet	Salem	*m.*	*g.*	Sept.—Oct.	Yellow—dull	Irregular roundish.
Knight's R. I. Seedling	Rhode Island	*s.*	*v. g.*	Sept	Yellowish green—red cheek	Obovate.
King's Seedling		*m.*	*g.*	Oct	Yellow—red cheek	Oblate angular.
Lenawee	Michigan	*m.* to *l.*	*v. g.*	Mid. Aug	Yellow—bright red cheek	Pyriform.
Locke	Cambridge	*m.*	*g.*	Nov—Dec	Yellowish green—green spots	Round obovate.
Lee's Seedling	Salem	*m.*	*f.*	Sept	Greenish russet	Oval.
McBean	Monroe Co., N. Y.	*l.*	*f.*	Oct	Yellow—russet spots	Depressed pyriform.

CATALOGUE OF NATIVE VARIETIES OF PEARS—*Continued.*

VARIETY.	LOCALITY OF ORIGIN.	SIZE.	QUALITY	RIPENS.	COLOR WHEN RIPE.	SHAPE.
Muskingum		*m.*	*g.*	Aug.	Greenish yellow	Roundish.
Muscadine	Newberg	*m.*	*v. g.*	First Sept.	Yellowish green	Round obovate.
Martha Ann	Roxbury	*m.*	*g.*	Nov.	Yellow	Long obovate.
Mather	Pennsylvania	*m.*	*g.*	Aug.	Red	Obovate.
Maynard	Pennsylvania	*m.*	*g.*	July	Yellow—red cheek	Obovate pyriform.
McLoughlin	Saco, Me.	*l.*	*g.*	Nov—Jan	Yellow	Obtuse pyriform.
Meriam	Roxbury	*l.*	*v. g.*	Sept—Oct	Yellow—russeted	Roundish.
Mitchell's Russet	Bellville, Ili.	*m.*	*g.*	Nov.	Russet gray dots	Obovate cone.
Moyamensing	Philadelphia	*m.*	*g.*	Aug—Sept.	Yellow—gray dots	Obovate rough.
Naumkeag	Salem	*m.*				Roundish.
Newtown Seedling						
Newtown Virgalieu	Long Island	*l.*	*p.*	Nov—Dec.		
Osband's Summer	Wayne Co., N. Y.	*s.*	*v. g.*	First Aug.	Yel. green and brown dots	Obovate.
Osborne	Indiana	*m.*	*g.*	Sept.	Yellowish green	Short pyriform.
Ontario	Geneva, N. Y.	*m.*	*v. g.*	Sept.	Pale yellow—green dots	Obtuse pyriform.
Oliver's Russet		*s.*	*p.*	First Oct.	Russet yellow—blush	Roundish.
Owen		*m.*	*p.*	Nov.	Dark green	Roundish oval.
Ott	Montgom. Co., Penn.	*s.*	*b. v. g.*	Aug.	Greenish yellow	Roundish.
Pope's Scarlet Major	Long Island	*l.*	*p.*	Aug.	Yellow—red cheek	Obovate.
Pope's Quaker	Long Island	*m.*	*g.*	Oct.	Yellowish russet	Oblong pyriform.
Prince's Sugartop	Flushing	*s.*	*p.*	July	Yellow	Ovate.
Prince's Perpetual	Flushing	*s.*	*f.*	May	Greenish	Irregular turbinate.
Philadelphia	Philadelphia	*l.*	*v. g.*	Sept.	Yellow—russet dots	Oblate pyriform.
Pennsylvania	Philadelphia	*m.*	*g.*	Sept.	Brownish russet yellow	Obovate.
Pardee	New Haven	*s.*	*g.*	Oct.	Greenish yellow russeted	Roundish.
Pratt	Rhode Island	*m.* to *l.*	*b.*	Sept.	Yellow—russet dots	Obovate pyriform.
Paddock	Burlington	*s.*	*g.*	July	Yellow	Pyriform.
Pater Noster		*l.*	*v. g.*	Nov—Dec.	Yellow—russet	Oblong.
Platt	Clinton, N. Y.	*l.*	*g.*	Oct—Nov.	Yellow	
Pochahontas	Quincy, Mass.	*m.*	*v. g.*	Oct.	Yellow—red cheek	Turbinate pyriform.
Pulsifer	Illinois	*m.*	*v. g.*	First Aug.	Yellow—russet	Obtuse pyriform.
Queen of August	Flushing	*l.*	*v. g.*	Aug.	Yellow	Pyriform.
Raymond	Maine	*m.*	*v. g.*	Sept.	Yellow—russet stalk	Obovate.

Reading	Pennsylvania	*l.*	*g.*	Jan—Mar	Yellow—russet dots	Long angular pyriform.
Richards	Wilmington	*l.*	*g.*	Oct	Yellow —russet dots	Obovate pyriform.
Roe's Bergamot	Newberg	*m.*	*v. g.*	Sept	Yellow—mottled russet	Oblate bergamot.
Ropes	Salem	*m.*	*g.*	Oct—Nov	Cinnamon russet	Obovate.
Rapalye's Seedling	Astoria, L. I.	*l.*	*v. g.*	Sept	Yellowish	Obtuse pyriform.
Regnier						
Surpasse Virgalieu	Brooklyn, L. I.	*l.*	*b.*	Oct	Yellow	Obovate.
Shurtleff	Boston	*m.*	*f.*	Sept	Greenish yellow, red cheek	Round obovate.
Salisbury Seedling	New York	*m.*	*p.*	Oct	Rusety	Depressed pyriform.
Shepherd	Dorchester	*l.*	*g.*	Sept—Oct	Yellow—russet spots	Pyriform.
Sterling	Livingston Co., N. Y.	*m.*				Roundish oval.
Styer	Mont. Co., Penn.	*m.*	*v. g.*	Sept	Yellow—russet marks	Roundish.
Stone	Ohio	*l.*	*g.*	Aug	Yellow blush	Broad pyriform.
Silliman's Russet		*s.*	*p.*	Aug	Brownish russet	Roundish obovate.
Selleck	Sudbury, Vt.	*l.*	*v. g.*	Sept—Oct	Yellow—red cheek	Obtuse pyriform.
Taylor Pear	Charlottes, Va	*m.*	*v. g.*	Nov—Feb	Greenish mottled.	Roundish.
Tea	Milford, Conn	*m.*	*v. g.*	Sept	Yellow—russet dots	Obovate pyriform.
Thorp	Brandon, Vt.	*l.*	*g.*	Oct	Yellow blush	Obtuse pyriform.
Totten's Seedling	New Haven	*m.*	*v. g.*	Sept—Oct	Yellow blush	Turbinate pyriform.
Tyler	New Haven	*s.*	*f.*	Oct	Yellow—russet dots	Turbinate.
Unohlan	Pennsylvania.	*s.*	*f.*	Aug	Yellow—golden russet	Roundish.
Upper Crust	South Carolina	*s.*	*p.*	July	Green—russety	Obtuse pyriform.
Van Buren	New Haven	*l.*	*g.*		Yellow—red blush	Obovate.
Williamson	Long Island	*m.*	*v. g.*	Oct	Yellow—golden	Obovate.
Winship	Brighton, Mass	*m.*	*g.*	Aug	Yellow blush	Ovate pyriform.
Wharton's Early	Ohio	*m.*	*v. g.*	Aug	Yellowish green	Oblong pyriform.
Wadleigh	New Hampshire	*s.*	*g.*	Sept—Aug	Yellow	Round obovate.
Wilmington	Philadelphia	*m.*	*b.*	Sept	Cinnamon russet	Obtuse pyriform.
Westcott	Rhode Island	*m.*	*g.*	Sept—Oct	Yellow—gray dots	Irregular roundish.
White's Seedling	New Haven	*m.*	*g.*		Greenish yellow	Round obovate.
Wiert	Pennsylvania	*m.*	*g.*	Sept	Green—green dots	Globular.
William's Early	Roxbury	*s.*	*g.*	Sept	Yellow—red dots	Round turbinate.
Wilbur	Somerset, Nass.	*m.*	*g.*	Sept	Russeted green	Obovate.
Winter Seckel	Fredericksburg, Va.	*m.*	*v. g.*	Feb	Yellowish brown, red cheek	Obovate.
Wilkinson	Cumberland, R. I.	*m.*	*v. g.*	Oct—Dec	Bright yellow	Obovate.
Zoar Beauty	Zoar, Ohio	*m.*	*g.*	First Aug	Yellow—red cheek	Pyriform, depressed.
Zoar Flat	Ohio	*s.*	*p.*	Sept—Oct	Green	Obovate.

CATALOGUE

OF

VARIETIES OF PEARS OF FOREIGN ORIGIN,

WITH THEIR SYNONYMS IN ITALICS.

- Abbe Mongein.
- Abbe Edouard.
- Agathe de L'Escour.
- Ah! Mon Dieu.
    - *D'Abondance.*
    - *D'Amour.*
- Alberty.
- Alexandre Berkmans.
- Alexandre Bivort.
- Alexandre Lambre.
- Alexandrina.
- A Longue Queue.
- Alphonse Karr.
- Ambrette.
    - *Epineuse.*
- Amire Johannet.
    - *Saint-Jean.*
- Ananas.
- Angelique de Bordeaux.
- Angelique de Rome.
- Angleterre d'Hiver.
- Angora.
- Arlequin musque.
- Aston town.
- Auger.
- Auguste de Boulogne.
- Augustine Lelieur.
- Aurate.
- Adelaide de Reves.
- Alpha.
- Ananas de Courtrai.
- Ananas d'Ete.
- Arbre Courbe.
    - *Amiral.*
    - *Colmar Charnay.*
- Auguste Boyer.
- Autumn Colmar.
- Amadote.
    - *Beurre Knox.*
    - *Madot.*
    - *Beurre Blanc de Capucins.*
- Ambrette.
    - *Ambrette Epineuse.*
- Angelique de Bordeaux.
- Arnaud Bivort.
- Althorpe Crassane.
- Ambrosia.
    - *Early Beurre.*
- Angleterre.
    - *English Beurre.*
    - *Beurre d'Angleterre.*

- Bartlett.
    - *Williams.*
    - *Williams' Bon Chretien.*
    - *Poire Guillaume.*
    - *De la Vault.*
    - *Clement Doyenne.*
- Barbancinet.
- Baronne de Melo.
    - *Adele de Saint-Ceras.*
- Beau present d'Artois.
    - *Present royal de Naples.*
- Belle de Bruxelles.
    - *Beurre de Bruxelles.*
- Belle de Bruxelles without kernel.
- Belle *D'Aout, or August.*
- Belle de Ferron
- Belle de Noel.
    - *Apres Noel.*
    - *Fondante Noel.*
    - *Souvenir Esperen.*
- Belle du Plessis.
- Belle Julie.
    - *Alexandre Helie.*
- Belle Vernie, or Vernis.
    - *Delices de Mons.*
- Belle Epine du Mas.
    - *Dumas.*
    - *Epine de Rochefort.*
    - *Epine de Limoges.*
    - *De Rochechouart.*
    - *Duc de Bordeaux.*
    - *Epine du Mas.*
    - *Epine du Rochois.*
    - *Epine du Rochoir.*
- Belle Fondante.
- Belle et Bonne.
    - *Schone und Gute.*
    - *Gracieuse.*
- Belle lucrative.
    - *Bergamotte lucrative.*
    - *Beurre lucratif.*
    - *Bergamote Fievee.*
    - *Fondante d'Automne.*
    - *Grosilliere.*
    - *Seigneur Esperin.*
- Bellissime d'Ete.
    - *A deux yeux.*
    - *Jargonnelle of the French.*
    - *Sabine d'Ete.*
    - *Supreme.*
- Bergamot Buffo.
    - *Crapaud.*
    - *Beurre Beauchamps.*
    - *Beauchamps.*
    - *Bergamotte Cadette.*
    - *Poire de Cadet.*
    - *Belle de Brissac,* incorrectly *Ogonet.*
- Bergamote, Crassanne.
    - *Crassanne.*
- Bergamote, a Feuilles Panachees.
- Bergamote Crassanne d'Ete
- Bergamote d'Angleterre.
- Bergamote d'Automne.
    - *Grosse Ambrette.*
- Bergamote d'Ertrycher.
- Bergamote d'Ete.
    - *Beurre blanc or white.*
    - *Beurre d'Ete.*
    - *Beurre Ronde.*
    - *Milan Blanc.*
    - *Milan de la Beuvriere.*
    - *Mouille Bouche.*
- Bergamote d'Ete Panachee.
- Bergamote Drouet.
- Bergamote Dussart.

- Bergamote de Heimbourg.
- Bergamote Esperen.
- Bergamotte Gansels.
  - *Brocas Bergamot.*
  - *Ives' Bergamot.*
  - *Staunton.*
  - *Bonne Rouge.*
  - *Gurles Beurre.*
  - *Diamant.*
- Bergamotte d'Esperin.
- Bergamotte Gandry.
- Bergamotte Lesefie.
- Bergamotte de Millepieds.
- Bergamotte d'Hollande.
  - *Holland Bergamotte.*
  - *Beurre d'Alencon.*
  - *Bergamotte d'Alencon.*
  - *Jardin de Jougers.*
  - *Bergamotte de Fougere.*
  - *Amoselle.*
  - *Lord Cheeneys.*
  - *Sarah.*
- Bergamot, Easter.
  - *Bergamotte de Paques.*
  - *Bergamotte d'Hiver.*
  - *Bergamotte de Bugi.*
  - *Bergamotte de Toulouse*
  - *Roberts's Keeping.*
  - *Winter Bergamotte.*
  - *Paddrington.*
  - *Royal Fairling.*
  - *Tuling.*
  - *St. Herplain d'Hiver.*
  - *Doyenne d'Hiver.*
  - *Soldat.*
- Bergamot, Lageret.
- Begamot, Suisse.
  - *Swiss Bergamot.*
- Bergamot, Autumn.
  - *English Bergamot.*
  - *Common Bergamot.*
  - *York Bergamot.*
  - *English Autumn Bergamot.*
- Bergamot, Early.
- Bergamot, Summer.
- Bergamot, Hampden's.
  - *Summer Bergamot.*
  - *Bergamot d'Angleterre.*
  - *Fingal's.*
  - *Bergamotte d'Ete.*
  - *Scotch Bergamot.*
  - *Ellanrioch.*
- Bergamotte de Malines.
- Bergamotte de Parthenay.
  - *Poireau.*
- Bergamotte, Rose.
- Beurre Antoine.
  - *Saint Germain fondant.*
- Beurre Antoinette.
- Beurre Auneniere.
- Beurre Bachelier.
- Beurre Beauchamp.
- Beurre Benoist.
  - *Benoits.*
  - *Beurre Auguste Benoit.*
- Beurre Berckmans.
- Beurre Biemont.
- Beurre blanc de Nantes.
  - *Beurre de Nantes.*
  - *Beurre Nantais.*
- Beurre Bosc.
  - *Boscs Thascherbirne.*
- Beurre, Easter.
  - *Bergamotte de la Pentecote.*
  - *Beurre de la Pentecote.*
  - *Beurre d'Hiver deBruxelles.*
  - *Doyenne d'Hiver.*
  - *Doyenne du Printemps.*
  - *Beurre Roupe.*
  - *Du Patre.*
  - *Beurre de Paques.*
  - *Phillipe de Paques.*
  - *Besi Chaumontel tres gros.*
  - *Chaumontel tres gros.*
  - *Canning.*
  - *Seigneur d'Hiver.*
- Beurre Gris d'Hiver Nouveau.
  - *Beurre Gris d'Hiver.*
  - *Beurre Gris de Lucon.*
  - *BeurreGris Superieure*
  - *Beurre de Fontenay.*
- Beurre d'Anjou.
  - *Ne Plus Meuris.*
  - *Nec Plus Meuris.*
- Beurre Diel.
  - *Diels Butterbirne.*
  - *Diel.*
  - *Dorethee Royale.*
  - *Gros Dorethee.*
  - *Celeste.*
  - *Des tres Tours.*
  - *Dillon*, or *Gros Dillon.*
  - *Sylvanche vert d'Hiver.*
  - *Beurre Royale.*
  - *Mabille.*
  - *Beurre d'Yelle.*
  - *De Melon.*
  - *Melin de Kops.*
  - *Royal.*
  - *Dry-toren.*
  - *Florimond.*
- *Beurre Incomparable.*
- *Beurre Magnifique.*
- Beurre Sterkmans.
  - *Doyenne Sterkmans.*
  - *Bell Alliance.*
- Beurre Navez.
  - *Colmar Navez.*
- Beurre Richelieu.
- Beurre d'Aremberg.
  - *Orpheline d'Enghien.*
  - *Duc d'Aremberg.*
  - *Deschamps.*
  - *Colmar Deschamps.*
  - *D'Aremberg parfait.*
  - *L'Orpheline.*
  - *Beurre des Orphelins.*
- Beurre Spence.
- Beurre Amande.
  - *Almond Pear.*
  - *Noisette.*
  - *Beurre Judes.*
  - *Beurre d Angleterre.*
  - *Longue de Narkoute.*
  - *Monkorothy*
- Beurre Fougierre.
- Beurre Beaulieu.
- Beurre Winter.
- Beurre Bennert.
- Beurre Six.
- Beurre Drapiez.
- Beurre Soulange.
- Beurre de Montgeron.
  - *New Frederick of Wirtemberg.*
- Beurre de Quenast.
- Beurre Scheidweiler.
- Beurre Citron.
- Beurre d'Elberg.
- Beurre Duhaume.
- Beurre de Brignais.
  - *Des Nonnes.*
  - *Poire des Nones.*
- Beurre Leon le Clerc.
- Beurre Brown.
  - *Beurre Gris.*
  - *Gray Beurre.*
  - *Beurre d'Amboise.*
  - *Beurre Dore.*
  - *Beurre Isambert.*
  - *Beurre Rouge.*
  - *Red Beurre.*
  - *Beurre.*
  - *Golden Beurre.*
  - *Beurre d'Or.*
  - *Beurre d'Ambleuse.*
  - *Beurre Vert.*
  - *Beurre du Roi.*
  - *Isambert le Bon*, incor. *Beurre d'Anjou.*
- Beurre d'Amaulis.
  - *Beurre d'Amanlis.*
  - *Beurre d'Amalis.*
  - *Wilheinmine.*
- Beurre d'Amaulis, var.
- Beurre Colmar.
  - *Colmar d'Automne.*
- Beurre Millet of Guernsey.
  - *Mollet's Guernsey Chaumontel.*
- Beurre Rance.
  - *Beurre de Rans.*
  - *Beurre de Flandre.*
  - *Beymonte.*
  - *Bon Chretien de Rance.*
  - *Beurre Nairchain.*
  - *Hardenpont de Printemps.*
  - *Beurre Epine.*
- Beurre Bieumont.
  - *Beymonte.*
- Beurre de Mortfontaine.
  - *Beurre Lefevre.*

- Beurre Boisfunel.
- Beurre de Gommery.
- Beurre de Hamptienne.
- Beurre Precoce.
- Beurre Van de Putte.
- Beurre de Beaumont.
  - *Besi Vaet.*
- Beurre Seutin.
- Beurre Kenrick.
- Beurre Knox.
- Beurre Bretonneau.
- Beurre Bronze.
- Beurre Brougham.
- Beurre Bruneau.
  - *Saint Herblain.*
  - *Crassanne Bruneau*
- Beurre Burnicq.
- Beurre Capiaumont.
  - *Capiamont.*
  - *Aurore.*
- Beurre d'Angleterre.
  - *Archiduc Charles.*
  - *Bec d'Oie.*
- Beurre d'Avoine.
- Beurre de Bollwiller
- Beurre de Koning.
- Beurre de Launay.
- Beurre de Moise.
- Beurre de Paimpol.
- Beurre de Reine.
- Beurre Charron.
- Beurre Chatenay.
- Beurre Clairgeau.
- Beurre Coloma.
  - *Capucine d'Autumn.*
- Beurre Curtet.
  - *Comte Lami.*
  - *Beurre Quetelet.*
- Beurre d'Albret.
- Beurre des Beguines.
- Beurre d'Ecole.
- Beurre Defais.
- Beurre Derouineau.
- Beurre d'Enghien.
- Beurre d'Hardempont.
- Beurre Duval.
- Beurre Gens.
- Beurre Giffard.
- Beurre Goubault.
- Beurre Gris d'Hiver, the old.
- Beurre de Zurick.
- Beurre Milan d'Hiver.
- Beurre Gris d'Hiver de Lucon.
- Beurre Hamecker.
- Beurre Hardy.
- Beurre Kennes.
- Beurre Knight.
- Beurre Kossuth.
- Beurre Langelier.
- Beurre Loisel.
- Beurre Millet.
- Beurre Moire.
- Beurre Mondelle.
- Beurre Noisette.
- Beurre Oudinot.
- Beurre Payen.
- Beurre Philippe Delfosse.
- Beurre Romain.
- Beurre Saint Louis.
- Beurre Saint Nicholas.
  - *Duchesse d'Orleans.*
- Beurre Seringe.
  - *Doyenne fondant.*
- Beurre Superfin.
- Beurre Wetteren.
- Besi Liboutton.
- Besi du Caissoy or Quessoy.
  - *Roussette d'Anjou.*
  - *Besy Quessoy d'Ete.*
- Besi de Chassery.
  - *Echassery.*
- Besi de Chaumontel
  - Do., Variegated.
- Bezi d'Heri.
  - *Besi Royal,*
  - *Rumelbirne.*
- Besi Bosman.
- Bezi de Montigny
  - *Louis Bosc.*
  - *Doyenne Musque.*
  - *Trouve de Montigny.*
  - *Beurre Romain.*
- Bezi de La Motte.
  - *Beurre blanc de Jersey*
  - *Bein Armandi.*
- Bezy Garnier.
  - *Garnier.*
- Besi de Vindre.
- Bezi des Veterans.
  - *Rameau.*
- Bezi Esperen.
- Bezi Goubalt.
- Bezi Incomparable.
  - *Besi Sanspariel.*
  - *Bergamotte Sanspariel.*
- Bezi Saint Vaast.
  - *Beurre Beaumont.*
- Bezi, Tardy.
- Bonne d'Ezee.
  - *Bonne des Haies.*
  - *Bonne de Zees.*
  - *Bonne de Longueval.*
  - *Belle et Bonne d'Ezee.*
- Bon Chretien Fondante.
- Eon Gustave.
- Bonne Charlotte.
  - *Bon Chretien Flemish.*
  - *Bon Chretien de Turc.*
- Bon Chretien d'Espagne.
  - *Bon Chretien Spanish.*
- Bon Chretien d'Ete.
  - *Gracioli.*
  - *Reed's Seedling.*
- Bon Chretien d'Hiver.
  - *Bon Chretien d'Angoisse.*
- Bon Chretien d'Angoisse—variegated.
- Bishop's Thumb.
- Black Worcester.
  - *Black Pear of Worcester.*
  - *Parkinson's Warden.*
- Bois Napoleon.
- Bon Parent.
- Bonne Emilie.
- Blanquet Alexis.
- Blanquet a Long Queue.
- Blanquet de Saintonge.
- Blanquet le Gros.
  - *Roi Louis.*
- Blanquet le Petit.
  - *Blanquet a la Perle.*
  - *Blanche Fleur.*
  - *Cire*
- Blanquet Precoce.
- Bouoquia.
  - *Beurre Bouoquia.*
- Bourgemester.
  - *Bouvier Bourgemester.*
- Brougham.
- Brandes.
  - *Saint Germain Brandes.*
- Brialemont.
- Broom Park.
  - *Sobden Court.*

- Cadet de Vaux.
- Caillot Rosat.
- Calebasse Bosc.
- Calebasse de Bavay.
- Calebasse Delvigne.
- Calebasse d'Ete.
- Calebasse Musk.
- Calebasse Tougard.
- Calebasse Verte.
  - *Calebasse Green.*
- Calebasse.
  - *Calebasse Double Extra.*
  - *Calebasse d'Hollande.*
  - *Beurre de Payence.*
- Caen de France.
- Camerlyn.
- Cassante de Mars.
- Catinka.
- Charles Van Houghten.
- Charles Smit.
- Charles Frederick.
- Charlotte de Brower.
- Colmar d'Alost.
- Count Lelieur.
- Compte of Paris.
- Compte of Flanders.
- Conseillier de la Cour.
  - *Marechal de la Cour.*
- Calebasse Grosse.
  - *Calebasse Monstre.*
  - *Carafon*
  - *Poire Carafour.*
  - *Boutelle.*
  - *Triomphe de Nord.*
  - *Triomphe de Haslet.*
- Compte de Lamy.
  - *Beurre Curti.*
  - *Dingler.*

- *Marie Louise Nora.*
- *Marie Louise the Second.*
- Conseiller Ranwez.
  - *Conseiller de Ranweze.*
- Coter.
- Crassane d'Hiver.
- Caperon du Mons.
- Capucin Van Mons.
- Cent Couronnes.
- Chair a Dame.
- Cherroise.
- Choice of an Amateur.
- Colmar.
  - *Maunne.*
  - *De Maune.*
  - *Incomparable.*
  - *Winter Virgalieu.*
- Colmar Artoisenet.
- Colmar d'Aremberg.
  - *Cartofell.*
- Colmar d'Automne Nouveau.
- Colmar de Silly.
- Colmar des Invalides.
  - *Van Mons.*
- Colmar d'Ete.
- Colmar Musque.
- Colmar Souverain.
- Coltin.
- Citron des Carmes a Long Queue.
- Countesse d'Alost.
- Countesse de Lunay.
- Cops Heat.
- Cornelia.
- Crassane Althorpe.
- Catillac.
  - *Bon Chretien d'Amiens.*
  - *Chartreuse.*
  - *Gros Gilot.*
  - *Monstre.*
  - *Teton de Venus.*
- Chaumoisine.
- Coulon Saint Marc.
  - *Belle de Thouars.*
- Catherine Lambree.
- Cure d'Œlenghem.
- Chaumontel.
  - *Bezi de Chaumontel.*
  - *Winter Beurre.*
  - *Beurre d'Hiver.*
  - *Oxford Chaumontel.*
- Charles of Austria.
- Clara.
  - *Claire.*
- Clinton.
- Colmar Nfell.
- Colmar Epine.
- Comprette.
- Commodore.
- Crassane.
  - *Bergamotte Crassane.*
  - *Beurre Plat.*
  - *Cresane.*
- Crawford.
- Croft Castle.
- D'Aloutte.
- Dame Verte.
- De Bavay.
  - *Poire de Bavay.*
- De Coq.
- De Deux Ors l'An.
- De Lamartine.
- De Lestumire.
- Delices Charles.
- Delices de Jodoigne.
- Delices de Louvenjoul.
  - *De Louvoyan.*
- Delices de la Meuse.
- Delices d'Hardempont of Angers.
- Delices d'Hardempont of Belgium.
  - *Fondante Pariselle.*
- Delices Dumortier.
- Des Chasseurs.
- Des deux Sœurs.
- Des Templirs Blanc.
- Dingler.
- Docteur Bouvier.
- Docteur Caperon.
- Docteur Trousseau.
- De Louvain.
  - *Poire de Louvain*
  - *Besy de Louvain.*
- De Sorlus.
  - *Bergamotte de Sorlus.*
- Desiree Cornelis.
  - *Cornelis.*
- De Tongres.
- Dundas.
  - *Elliot Dundas.*
  - *Rousselet Jumin.*
- Diller.
- Doyenne Robin.
  - *Beurre Robin.*
- Doyen Dillon.
  - *Deacon Dillon.*
- Doyenne Goubalt.
- Doyenne Defais.
- Doyenne Downing.
- Doctor Lentier.
- Duchesse d'Orleans.
  - *Beurre Saint Nicholas.*
  - *Saint Nicholas.*
- Duchesse de Berry d'Ete.
- Duchesse de Brabant.
- Duchess d'Angouleme.
  - *Des Eparonnais.*
  - *Pesenas.*
- Duchesse d'Angouleme, variegated.
- Duchess d'Aremberg.
- Dumortier.
- Dupuy Charles.
- Doyenne Rose.
- Duchesse de Mars.
- Dunmore.
- Douillard.
- Duc de Nemours.
  - *Beurre Naves.*
  - *Louis Bosc.*
- Dumont Dumortier.
- Duvernay.
- Doyenne Bossouck.
  - *Doyenne Bossouck Nouvelle.*
  - *Double Philipe.*
  - *Beurre de Merode.*
  - *Nouvelle Boussouck.*
- Doyenne d'Alencon.
  - *Doyenne d'Hiver d'Alencon.*
  - *Doyenne Gris d'Hiver Nouveau.*
  - *Doyenne Marbre.*
  - *Doyenne d'Hiver Nouveau.*
  - *St. Michal d'Hiver*
- Doyenne d'Ete.
  - *Summer Doyenne.*
  - *Duchesse de Berry d'Ete of Bivort.*
- Doyenne Sieulle.
  - *Sieulle.*
  - *Beurre Sieulle.*
  - *Bergamotte Sieulle.*
- Doyenne Gray.
  - *Gray Butter Pear.*
  - *Gray Deans.*
  - *Gray Doyenne.*
  - *Red Doyenne.*
  - *St. Michel Dore.*
  - *Doyenne Galeux.*
  - *Doyenne Roux.*
  - *Doyenne Cuvert.*
  - *Doyenne d'Autumn.*
  - *Red Beurre.*
  - *Beurre Rouge.*
  - *Doyenne Gris.*
- Doyenne White.
  - *Virgalieu.*
  - *St. Michael.*
  - *Doyenne Blanc.*
  - *Doyenne.*
  - *Yellow Butter.*
  - *Bergaloe.*
  - *White Beurre.*
  - *Warwick Bergamot.*
  - *Deans.*
  - *Bonne Ente.*
  - *Neige blanche.*
  - *Saint Michal blanc.*
  - *Snow Pear.*
  - *Reigner.*
  - *Beurre blanc.*
  - *Poire de Simon.*
  - *Poire Monsieur.*
  - *Citron de September.*
  - *Kaisserbirne.*
  - *Kaiser d'Autumn.*
  - *Butterbirne.*
  - *Nouvelle d'Ouef.*
  - *Dechantsbirne.*
  - *Valencia.*

Emile d'Hyest.
Eliza d'Hyest.
Emerald.
Edouard Sageret.
Enfant Prodigue.
Epine d'Ete.
Fondante Musque.
Satin Vert.
Esperine.
Eyewood.
Elizabeth Manning's.
Eastner Castle.
Echassery.
Echasserie.
Bisi d'Echassery.
Bisi d'Echassery.
Jagabirne.
Episcopal.
Fortune.
La Fortunee de Paris.
La Fortunee du Parmentier.
Bergamotte Fortunee.
Emerald.

Flemish Beauty.
Fondante des Bois.
Belle des Bois.
Belle de Flandres.
Bergamotte de Flandres.
Beurre des Bois.
Beurre Spence—erroneously.
Davy, or Poire Davy.
Feodale.
Tougaret.
Nouvelle Gagne a Hense.
Imperatrice de France.
Bosch Pear.
Bosch, or Bosch Nouvelle.
Bosc Sire
Fondante Abbret.
Fondante de Brest.
Cassante de Brest.
Inconnue de Chesneau
Fondante de Laynille.
Fondante de Malines.
Fondante de Noel.
Belle de Noel.
Belle Apres Noel.
Fondante de Millat.
Fondante du Comice Angers.
Fondante Van Mons.
Fondante Agreeable.
Fondante des Pres.
Forelle.
Aux Traites.
Grain de Corail.
Fortunee.
Forme de Bergamotte Crassanne.
Foureroy d'Hiver.
Francois.
Frederick le Clerc.
Frederick de Wirtemberg.
Beurre de Montgeron—erroneously.
Florimond Parent.
Fleur de Neige.
Snowflower.
Figue de Naples.
Comtesse de Frenol.
De Vigne Pelone.
Beurre Bronsee.
Fig Pear of Naples.
Figue d'Alencon.
Verte Longue de la Mayenne.
Figue d'Hiver.

Gabrourelis Seedling.
Geant.
General de Lamoriciere.
General Dutillewe.
Golden Beurre of Bilboa.
Gloire de Cambroul.
Gracioli de Jersey.
Jersey Gracioli.
Groom Princess.
Gros Lativeau.
Gansel's Seckel.
Gansel's Late Bergamotte.
Gil o Gil.
Garde d'Ecosse.
Dagobert.
Glace d'Hiver.
Grand Salomon.
Louis Philippe.
Gros Lucas.
Garnier.
Girardin.
Gloward.
Got.
Graslin.
Grand Soliel.
Gris de Chin.
Gros Cotelain.
Gustave de Bourgogne.
General Bosquet.
General Canrobert.
General de Lourmel.
Gideon Paridant.
Graslin.
Grosse Marie.
Gros Rousselet a'Aout.
Gendesheim.
Green Citron of Bohemia.
Citronbirne.
Green Pear of Yair.
Green Yair.
Glout Morceau.
Gloux or Glou Morceau
Beurre d'Hardenpont.
Hardenpont d'Hiver.
Colmar d'Hiver.
Linden d'Automne.
Beurre d'Aremberg in France.
Goulu Morceau.
Roi de Wurtemberg.
Beurre de Cambron.
Got Luck de Cambron.
Kronprins Ferdinand

Heathcot.
Heathcot de Gore.
Gore's Heathcot.
Hamon.
Besi Fondant.
Haute Montec.
Heliote Dundas.
Rousselet Jamain.
Henri Bivort.
Henri Caperon.
Henri IV.
Henri Quatre.
Jaquin.
Favori Musque.
Beurre Ananas.
Poire Ananas.
Hericart de Theury.
Hessel.
Hasel.
Hovey.
Heukel.
Henrietta.
Henri Bivort.
Hericart.
Hericart de Thusy.
Rushmore's Bon Chretien.
Hacon's Incomparable.
Incomparable Hacons.

Jargonelle English.
Real Jargonelle.
Beau Present.
Sweet Summer.
Beurre de Paris.
Cuillette.
Cuisse Madame.
Gros Cuisse Madame.
Epargne.
Saint Samson.
Poire de Tables des Princes.
Saint Lambert.
Belle Verge.
Jargonelle, French.
Bellissime d'Ete.
Bellissime Supreme.
Bellissime Jargonelle.
Red Muscadel.
Summer Beauty
Red Cheek.
Supreme.
Chaumontel d'Ete.
Vermilion d'Ete.
Sabine d'Ete.
English Red Cheek.
Udal.
Jalousie de Fontenay Vendee.
Jean de Witte.

- Julienne.
- Josephine de Malines.
- Jules Bivort.
- Jalousie Tardive.
- Jacquemine.
- Jaminette.
    - *Austrasie.*
    - *Beurre d'Austrassie.*
    - *Beurre Saint Helier.*
    - *Bergamotte Cheminette.*
    - *Pirolle Marot.*
    - *Sabine.*
    - *Wilhelmine.*
    - *Josephine.*
    - *Colmar Jaminette.*
- Jansenns.
- Jolivet.
- John Moutich.
- Jules Bivort.
- Jutte.
- Jurardiel.
- Jalvie.
- Inconnu Van Mons.
- Imperiale, Oak-Leaved.

- King Edwards.
- Knight's Monarch.
- Knight's Seedling.
- Knight's Edwards.

- La Caslebirne.
- La Herard.
- La Juive.
- Laure de Glymes.
- Leopold the First.
- Leurs.
- Long Verte of Coxe.
    - *Mouille Bouche*, erron.
    - *Long Green.*
- Long Green.
- Leon le Clerc.
    - *Leon le Clerc Leval.*
    - *Blanc-Per-Ne.*
- Little Muscat.
    - *Little Musk.*
    - *Petit Musk.*
    - *Primitive.*
    - *Muscat Petit.*
    - *Sept-en-Gueule.*
- Louise Bonne.
    - *Louise Bonne Real.*
    - *St. Germain Blanc.*
- Louise de Carcelles.
- Louise de Prusse.
- Louise Bonne de Jersey.
    - *Louise Bonne d'Avranches.*
    - *Bonne de Longueval.*
    - *Beurre, or Bonne Louise d'Avandore.*
    - *William the Fourth.*
- Lucien Leclerc.
- Louis Dupont.
- Limon.
    - *Beurre Hagersten.*
    - *Bergamotte Louise.*
- Lieutenant Poitevin.
- Liberale.
- La Canas.
    - *Bon-Parent.*
- Leon Leclerc.
    - *Leon Leclerc Epineux.*

- Mansuette.
- Marie Louise.
    - *Princess Parme.*
    - *Marie Chretienne.*
    - *Forme Marie Louise.*
    - *Braddick's Field Standard.*
- Marechal Dillon.
- Marechal Pelissier.
- Marianne de Nancy.
- Mignonne d'Hiver.
- Millot de Nancy.
- Marie Louise—*the new.*
- Martin Sec.
    - *Rousselet d'Hiver.*
- Madame Durien.
- Madame Elisa.
- Madeleine d'Angers.
- Marechal de Cour
    - *Conseilleur de la Cour.*
    - *Duc d'Orleans.*
- Marquise.
- Medaille d'Or.
- Melon.
- Menagerie.
- Messir, Jean.
    - *Mr. John.*
    - *Messir Jean Gris.*
    - *Messir Jean Golden.*
    - *John.*
    - *Monsieur John.*
    - *Messir Jean Blanc.*
- Miel des Carmes.
- Monseigneur Affre.
- Monstrous Wood.
    - *Nain Vert.*
- Muscat l'Allemand.
- Muscat Robert.
- Musquee d'Esperne.
- Michaux.
    - *Compte de Michaux.*
- Madeline.
    - *Magdalen.*
    - *Citron des Carmes.*
    - *Green Chisel*, incor.
    - *Early Chaumontel*, incorrectly.
- Madeline, variegated.
- March Bergamot.
- Moccas.
- Muscat Robert.
    - *Poire a la Reine.*
    - *D'Ambre.*
    - *St. Jean Musquee Gros.*
    - *Musk Robine.*
    - *Early Queen.*
    - *Queen's Pear.*
- Marie Parent.
- Napoleon.
    - *Beurre Napoleon.*
    - *Bon Chretien Napoleon.*
    - *Captive of St. Helena.*
    - *Charles X.*
    - *Charles d'Austria*, incor.
    - *Gloire de l'Empereur.*
    - *Liard*, incor.
    - *Meabille.*
    - *Medaille.*
    - *Wurtemberg*, incor.
    - *Sucree Doree.*
    - *Roi de Rome.*
    - *Bonaparte.*
- Nectarine.
- Nielle.
    - *Beurre Niel.*
    - *Poire Neill.*
    - *Colmar Bosc.*
    - *Fondante du Bois*, incorrectly.
- Neufmaisons.
    - *Belle Alliance.*
    - *Neuve Maison.*
    - *Serruvier d'Automne.*
- Nouveau Poiteau.
    - *Retour de Rome.*
    - *Tombe de l'Amateur.*
- Nouveau Simon Bouvier.
- Ne Plus Meuris.
- Niles.

- Omer Pasha.
- Orpheline Colmar.
- Orange d'Hiver.
    - *Winter Orange.*

- Passe Colmar.
    - *Passe Colmar Epineux.*
    - *Passe Colmar Gris*, or *Dore.*
    - *Passe Colmar Nouveau.*
    - *Pucelle Condesienne.*
    - *Golmar Gris.*
    - *Ananas d'Hiver.*
    - *Beurre Colmar Gris.*
    - *Precel.*
    - *Fondante de Panisel.*
    - *Fondante de Mons.*
    - *Beurre d'Argenson.*
    - *Regintin.*
    - *Colmar Hardenpont.*
    - *Colmar Souveraine*
    - *Colmar Preule.*
    - *Colmar Doree.*
    - *Gambier.*
    - *Celliste.*
    - *Marotte Lucre Jaune.*
    - *Pusent de Malines.*
    - *D'Ananas.*
- Passe Colmar of Belgium.
- Passe Colmar of France.
- Passe Colmar Musque.
- Pater Noster.
- Paquency.
- Peach Pear.

- Poire Peche.
- Pengethly.
- Passans du Portugal.
  - *Summer Portugal.*
  - *Miller's Early.*
- Paradise d'Automne.
  - *Calebasse Bosc.*
  - *Maria Nouvelle.*
  - *Princess Marianne.*
- Phillippe Goes.
- Pio IX.
- Poire d'Albret.
- Poire d'Abondance.
- Poire des Chasseurs.
- Poire de Lepine.
  - *De Lepine.*
  - *Delepine.*
- Paul Ambre.
- Prevost..
  - *Poire Prevost.*
- Prince Albert.
- Pailleau.
- Pitt's Prolific.
  - *Pitt's Surpasse Marie.*
  - *Surpasse Marie Louise*, incorrect.
- Princess Marie.
- Princess Charlotte.
- Princess of Orange.
  - *Princess Conquette.*
- Pain et Vin.
  - *Chaumontel Anglaise.*
  - *Chene Vert.*
  - *Chene Vin.*
- Parfum d'Aout.
- Parfum d'Hiver.
- Paul Thiens.
- Pomme.
- Prodil.
- Professor Dubreuil.
- President Parigot.
- Prince Imperial.
- Princess Helene d'Orleans.

- Queen of the Low Countries.
  - *Queen of Netherlands.*
  - *Reine des Pays Bas.*
- Quilette.

- Reine des Belges.
- Reine des Poires.
- Reine d'Hiver.
- Revillere.
- Rushmore.
- Rondelet.
- Rostiezer.
- Rouge des Vierges.
- Rousselet de Cour.
- Rousselet de Rochefort.
- Rousselet d'Hiver.
- Rousselet le Gros.
  - *Roi d'Ete.*
- Rousselet variegated.
- Rousselet Perdreau.
- Rousselet de Meester.
  - *Ferdinand de Meester.*
  - *Surpasse Meurice.*
- Rousseline.
- Rousselon.
- Royale d'Ete.
  - *Robine.*
- Royal d'Hiver.
- Rousselet Hatif.
  - *Early Catherine.*
  - *Kattern.*
  - *Cyprus Pear.*
  - *Early Rousselet.*
  - *Perdreau.*
  - *Poire de Chypri.*
- Rousselet de Rheims.
  - *Rousselet.*
  - *Petit Rousselet.*
  - *Spice Pear.*
  - *Musk Pear.*
- Retour de Rome.
- Rousselet d'Esperen.
  - *Rousselet Double.*
- Rousselet Enfant Prodigue
  - *Enfant Prodigue.*
- Rosabirne.
- Ridelles.
  - *Beurre Andusson.*
  - *Poire Ritelle.*
- Rousselet Vanderveeken.
- Rousselet Stuttgart.
- Rateau Gris.
  - *Beurre de Louvain.*

- Sabine d'Hiver.
- Saint Andre.
- Saint Augustin.
- Saint Georges.
- Saint Germain.
  - *St. Germain Gris.*
  - *Inconnue Lafare.*
  - *St. German Jaume.*
- Saint Germain Van Mons.
- Saint Germain, variegated.
- Saint Germain Gris.
- Saint Ghislein.
  - *Quinnipiac.*
  - *Duck Monarch.*
- Saint Germain Brande's.
- Saint Andre.
- Saint Menin.
- Saint Isaure.
- Saint Jean Baptiste.
- Saint Joseph.
- Saint Louis.
- Saint Michel Archange.
  - *Plombgastel.*
- Saint Vincent de Paul.
- Saint Dorethee.
  - *Royale.*
  - *Nouvelle.*
- Saint Denis.
- Sanguinole.
  - *Sanguine de France.*
- Sanguine d'Italie.
- Sans Peau.
  - *Skinless.*
  - *Poire Sanspeau.*
  - *Fleur de Guignes.*
- Serrurier.
  - *Surrier d'Automne.*
  - *Fondante de Millot.*
- Simon Bouvier.
- Sdegnata.
- Simon.
- Souvenir de Simon Bouvier
- Sorlus.
- Sucree de Zurich.
- Sucree Vert.
- Supreme d'Auray.
- Supreme Quinipor.
- Suzette de Baray.
- Soldat Laboreur.
  - *Auguste Van Krans.*
- Souveraine de Printemps.
  - *Poire de Printemps.*
- Souveraine d'Ete.
- Styrian.
- Supreme de Quineper.
- Surpasse Meuris.
- Surpasse Crassane.
- Saint Pere.
  - *De Pape.*
- Socquet.
- Sultan.
- Sucree de Corinne.
- Sucree de Hoyerswerder.
- Summer St Germain.
  - *Shorts St. Germain.*
  - *St. Germain d'Ete.*
  - *St. Germain of Martin.*
- Summer Franc Real.
  - *Franc Real d'Ete.*
  - *Fondante.*
  - *Gros Micet d'Ete.*
  - *Green Chisel.*
  - *Green Sugar.*
- Super Fondante.
- Swan's Egg.
  - *Moor-fowl Egg*, incorrect
- Summer Rose.
  - *Epine Rose.*
  - *Caillot Rosat d'Ete.*
  - *Thorny Rose.*
  - *Ognon.*
  - *Epine d'Ete.*
  - *Poire de Rose.*
  - *Epine d'Ete Coleur Rose.*
- Summer Bon Chretien.
  - *Bon Chretien d'Ete.*
  - *Gratioli.*
  - *Gratioli d'Ete.*
  - *Gratioli di Roma.*
  - *Summer Good Christian*
  - *Musk Summer Bon Chretien.*
  - *Sommer Apothikerbirne.*
  - *Sommer Gute Christenbirne*
  - *Die Sommer Christenbirne.*

  - *Large Sugar.*
- Sylvange.
  - *Bergamotte Sylvange.*
  - *Green Sylvange.*

- Tillington.
- Tarquin de Pyrenees.
- Theodore Van Mons.
- Thompson's.
- Thuerlinck.
- Triomphe de Jodoigne.
- Talmont.
- Tonnelet.
- Triomphe de Hasselt.
- Triomphe de Souvain.
- Triomphe de la Pomologie.
- Tavernier de Boulogne.
- Tresor d'Amour.
- Tonneau.

- Uveedales St. Germain.
  - *Angora.*
  - *Pound Pear.*
  - *Beauty of Turvensen.*
  - *Belle Angevine.*
  - *Belle de Jersey.*
  - *Bolivar.*
  - *Duchesse de Berry.*
  - *Duchesse de Berry d'Hiver.*
  - *Grosse de Bruxelles.*
  - *Royal d'Angleterre.*
- Urbaniste.
  - *Beurre Picquery.*
  - *Count Coloma.*
  - *St. Mearc.*
  - *Beurre Drapiez.*
  - *Louise d'Orleans.*
- Urbaniste Seedling.

- Van Mons. Leon le Clerc.
- Valette.
- Van Assche.
- Vauquelin.
  - *St. Germain Vauquelin.*
- Verte Longue d'Angers.
- Verte Longue Suisse.
  - *Verte Longue Panache.*
  - *Culotte de Suisse.*
- Vezouziere.
- Vicompte de Spielberg.
- Vigneuse d'Esperen.
- Vingt Mars.
- Vallie Franche.
  - *De Vallee.*
  - *De Renisheim.*
  - *Bonne de Renisheim.*
- Virgalouse.
  - *Poire Glace.*
  - *Chambrette.*
  - *Bujaleuf.*
- Vicar of Winkfield.
  - *Cure.*
  - *Mon. le Cure.*
  - *Clion.*
  - *Comice du Toulon*
  - *Belle Adrienne.*
  - *Belle de Berry.*
  - *Belle Heleree.*
- Walker.
  - 185 *of Van Mons.*
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- Willemoz.
- Wredon.
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  - *Summer Bell.*
  - *Konge.*
  - *Suisse, Madame.*
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  - *Bonne de Malines.*
  - *Colmar Nelis.*
  - *Nelis d'Hiver.*
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  - *Milanaise Cuvelier.*
  - *Etourneau.*
- Waterloo.
  - *Duc de Brabant.*
  - *Desiree Van Mons.*
  - *Fondante Charneuse.*
  - *Fondante des Charneuse.*
  - *Beurre Charneuse.*
  - *Mil de Waterloo.*
  - *Jamin.*
  - *Belle Excellente.*

- Yat.
  - *Yutte.*

- Zephyrin Gregoire.
- Zephyrin Louis Gregoire.

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